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Urges Federal Purchase of Cutover Lands

Congressman B. J. Gehrman Advocates Additional Cutover Lands Be Added To Federal Forest Areas In Wisconsin — Tolls Assessed Against Paper Mills — State Cooperates In River Pollution — Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 5, 1940—Purchase of additional cutover lands to be added to the federal forest areas in Wisconsin is being advocated by Congressman B. J. Gehrman. He has made appearances before the House appropriations sub-committee in Washington asking that additional funds be included in the agricultural supply bill for the 1941 fiscal year.

Although progress in Wisconsin reforestation has been among the greatest in the nation, the aim is to obtain perpetual supplies of pulp wood for the benefit of Wisconsin mills, against the day when present sources become exhausted, and wood will be at too great a distance to make shipment commensurate with market values of pulp.

Numerous areas are already under option by the federal forest service, and appropriations of $15,000,000 are sought to acquire these and lands in other states of the middlewest.

Considerable progress was made in reforestation in 1939. Reports issued by the Department of Agriculture show that 16,633 acres of tree plantations were established in Wisconsin alone, of which 8,569 acres were in the Chequamegon National Forest, and 8,064 in the Nicolet forest. Much of the planting was done by CCC workers. Wisconsin ranked second in the nation in the amount of plantings. The leading state was Michigan, from where Wisconsin mills draw a large supply of wood, with total plantings of 31,498 acres.

Extensive logging has been done in the federal areas this winter under a selective cutting plan, mostly by farmers and woodcutters who haul their logs direct to the mills. Value of the timber cut exceeds $50,000.

Institute of Paper To Hold New York Meeting

The board of trustees of the Institute of Paper Chemistry, Appleton, Wis., will hold a meeting in New York City during the convention of the American Paper and Pulp Association. It is scheduled for Monday, February 19. Dr. Thomas N. Barrows, president of Lawrence College and director of the Institute, Westbrook Steele, executive director, Ralph J. Watts, treasurer, and John Strange, secretary, will be among the executive officials attending. The Institute will also hold its alumni banquet at the Barclay hotel, New York, at 6:30 Wednesday evening, February 21.

Institute staff members who will attend the TAPPI sessions during the convention will include Dr. Otto Kress, technical director, Harry F. Lewis, dean, Charles M. Koon, J. A. Van den Akker and B. W. Rowland. Dr. Kress will be awarded the TAPPI medal, the presentation to be made by Ernst Mahler, vice-president of Kimberly-Clark Corporation, Neenah, Wis., and chairman of the Institute board of trustees.

State Cooperating to End River Pollution

Cooperating with the sulphite pulp mills in their research campaign to eliminate river pollution, the state sanitary engineering division of the Wisconsin State Board of Health has forwarded advisory suggestions to the committee of manufacturers working on the problem. When available data are gathered, they will be turned over to the research staff of the Institute of Paper Chemistry for scientific study.

L. F. Warrick, state sanitary engineer, has expressed himself well satisfied at the efforts being made to remedy the situation, a matter that has been discussed for years. He is in hopes that an economically feasible method can be found to reclaim waste materials from sulphite liquor, and has promised the assistance of his staff in whatever method is adopted.

The hope is that a reclamation process can be developed that will utilize the waste for profitable manufacture of by-products. The state hopes to clean up both the Fox and Wisconsin Rivers, where most of the mills are located.

Tolls Assessed Against Paper Mills

Tolls for reservoir storage maintenance will amount to $128,687 for the last half of 1939 to paper mills and power plants along the Wisconsin River, according to a schedule filed for approval with the Wisconsin Public Service Commission by the Wisconsin Valley Improvement Company. This represents a return of approximately 7 per cent in the investment in control reservoirs.

Sums assessed are:

Wisconsin Public Service Corporation—Wausau dam, $5,384.69, Eagle River dam, $302.68, Hat Rap-

(Continued on page 19)

Canada Need Not Fear Southern Competition

Ellwood Wilson In Four-Month Study of Newsprint Production Possibilities In Southern States Compares Major Factors In South With Canadian Facilities—Sees Great Demand For Chemical Pulp — Other News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 5, 1940—Does the establishment of a newsprint manufacturing industry in the Southern States menace the future of the newsprint industry of Canada? That is a question which has received a good deal of prominence in Canada of late, and another fillip to the discussion has been given by the first southern newsprint mill coming into operation. Consequently it has been with considerable interest that manufacturers here have heard from Ellwood Wilson, recognized as one of the foremost forestry consultants in the Dominion, that the threatened menace is a bogey that need not be feared.

Mr. Wilson has conducted a four-month's study of the subject in the Southern States, and he has come back to say "As a result of my four-month study on the ground I have reached the conclusion that we have nothing to fear."

South Posesses Certain Advantages

In an address on the subject he admitted that the South possessed certain advantages, as, for instance, an abundant supply of wood, a low stumpage price, simpler logging conditions and cheap labor.

As against these advantages, however, he points out that the wood consists chiefly of pine and hardwood, neither of which is suitable for the manufacture of sulphite pulp, "which has so much to do with the production of a good grade of paper." In using pine, he said, the sulphate process must be employed and the resulting pulp bleached. "So far, the paper produced cannot compare with the Canadian product." Hardwood could be used "only as a filler," he noted, adding that "it is possible that improved processes may be found, but some time must elapse."

With regard to the low stumpage price he said that competition between mills is slowly raising the price. As an offset to simpler logging conditions he said storage of wood was a problem, "as insects and fungi soon attack and spoil the wood. In early summer the wood is unfit for use after two or three weeks."

As to cheaper labor, there again competition was raising wages, and in any case the labor of the South was not as efficient as that of the Dominion.

Cost of Fire Protection Higher in South

Turning to the disadvantages of the South as compared with Canada he said the cost of fire protection there was on the average at least ten times higher than here, with the hazard very much greater.

Then the amount of pure, clear water "necessary for the operation of a newsprint mill," was difficult to obtain. The rivers were full of silt in the spring, Mr. Wilson said, and almost dry in the summer, and filtration was expensive. Mostly artesian well water must be used and it was often difficult to get this free from undesirable chemical content.

Then there was the reported rapidity of growth of Southern wood as compared with the growth in Canada. Mr. Wilson admitted that in the South trees when cared for do grow faster than trees in Canada, but said the yield on a per acre basis is only a little larger than here. "Their average yield can be taken as less than a cord per acre per year," he said; "on well managed spruce lands we can do almost as well and our quality is better."

As practical illustration, he thought it was interesting to note that on extensive plantations made by the old Laurentide Company, and now the property of the Shawinigan Water and Power Company, in 1920, measurements made last autumn show that from 20 to 40 cords of spruce had been produced in the 19 years. This showed, he said, that "we can under specific conditions raise timber of higher quality in only a few more years and that we can produce just as much per acre per year."

"All we need in Canada," Mr. Wilson concluded, "is intelligent forest management and we can hold our own against the world."

Sees Great Growth for Chemical Pulp Industry

Arthur A. Schmon, president of the Canadian Forestry Association, speaking at the annual dinner of the Canadian Society of Forestry Engineers in Ottawa, expressed the opinion that chemical uses of Canada's timber are only starting. He said in recent years the world demand for pulp products other than newsprint had advanced more rapidly than newsprint manufacture, so much so that newsprint today represents less than 30 per cent of the total products of the pulp log. He continued:

"In a world of wood substitutes, the pulp log rolls onward and upward to new levels of ingenious application. Cellulose chemistry continues to uncover new derivatives and new employments.

"What does this mean in terms of Canada's welfare? It means not alone sustained employment, but it promises a range of new types of forest industry calling for new skills and the raising of the volume of wage distribution. Nothing can hold back Canada from an ever-increasing profit from the harvests of her woodlands."

As to supply he said the forest area of Canada with its soil and climatic conditions was so favorable to reproduction that over-cutting alone never would totally destroy Canadian forests as such.

"The natural regeneration is so prolific that on the 1,000,000 square miles of land suitable only for the growing of trees there is no reason why our forest supply and resources cannot be maintained," he added.

Paper Box Sales Up 29.1 Per Cent

A big increase in Eastern sales lifted the orders booked by members of the Folding Paper Box Association of America contraseasonally during January. Preliminary reports showed an increase of 27.9 per cent over December and 29.1 per cent above January, 1939.

Midwest Market Reflects Temporary Lull

Paper Merchants In Chicago Territory Hold View That Current Decline In Activity Is Temporary and Market Will Soon Recover Its Strength—Traffic Revision Plea Presented—Milk Carton Suit Dissolved.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 5, 1940—The Chicago paper market was dull and without many redeeming points during the past week. Despite the continued presence of the present and future shortages in raw materials, the market locally is reported to give a slightly unsteady picture. Local paper executives feel that this is a short lived characteristic of the general market arising from the procedure of those who, finding the temporary lull in effect, are reported to be anxious to continue production at the highest possible capacity. The crowding of these products during the lull period is considered as the major reason for a situation believed temporary. Almost all lines shared in the quietness of the week. Kraft papers were in only fair demand while groundwoods and newsprints found buying and inquiries quieted down in their lines. Bonds and ledgers offered no change. Waste papers were unsteady according to report. Books and covers showed the lack of immediate buying wishes while specialty lines were likewise quoted as "marking time". While the slight unsteadiness was reported, local concerns indicated that it would probably have no real effect on the basic strength of the market itself.

Traffic Plea Revision Presented

In a move to place Chicago and middle western manufacturers in a better position to compete in Pacific Coast markets, a Chicago Association of Commerce traffic committee is presenting a plea for rate revisions to the Interstate Commerce Commission. Designated as "all freight rates" the rate structure advocated by the Chicago group suggests that there be a flat charge of $2.75 a hundred pounds on shipments with a minimum of 30,000 pounds regardless of commodity classifications of individual items in the cargo. The association's proposals would open the way for the establishment of carload commodity rates on many classifications not already enjoying carload benefits. The association has pointed out that granting of the requests would enable Chicago and other middle westerners to again compete in Pacific coast markets which they lost on account of competition from those shipping overland by trucks and from eastern manufacturers shipping via Panama Canal.

Paper Carton Suit Dissolved

Federal Judge Philip L. Sullivan this week ruled out two suits involving the use of paper containers for milk in Chicago. The American Can Company and the Ex-Cell-O Corporation of Detroit had appealed for an order compelling the Board of Health to permit the sale of paper containers to Chicago milk distributors. In ruling that he had no jurisdiction, Judge Sullivan held that the rights of the container manufacturers were not so affected as to give them a right to Federal Court relief. He indicated that the situation might be different if the suits had been brought by the milk distributors themselves for the right to use paper containers. Such a suit, with a distributing company as the distributor is represented by The Fieldcrest Dairies who, for three years, have been attempting to get permission to use paper containers. It is believed that inasmuch as Judge Sullivan did not rule on any phase of the constitutionality of the use of paper cartons in Chicago, the present decision will have no effect on the Fieldcrest litigation which is as yet undecided.

Sales Tax Liabilities Attracting Interest

The paper trade, still not quite certain as to the legality of the procedure of shipping paper direct to customers in Illinois from the mills outside Illinois as a means of avoiding payment of the Retailers Occupation Tax, is watching with interest the recent New York Supreme Court decision which upheld the right of the city of New York to apply its 2 per cent sales tax to coal shipments coming in from Pennsylvania. Particularly was the meaning of the "interstate commerce clause" given a new dressing up according to local authorities some of whom predict that the outcome of the case will eventually permit State authorities in Illinois to collect the 3 per cent sales tax on retail sales if buyer and seller live in Illinois, and do business in Illinois despite the origin of the shipment itself.

Ed. Schoenberg Goes to Dixon Co.

Ed Schoenberg, formerly advertising and promotional manager of the Munising Paper Company sales headquarters in Chicago, is reported to have resigned to accept a position in the sales department of the Salt Lake City division of Dixon & Company which has its headquarters in Denver.

Rosenthal with Western Paper Trading Co.

David G. Rosenthal, formerly in charge of Flexpak sales for the mid-western division of Hinde & Dauch Paper Company has recently opened an office in the Merchandise Mart for the Western Paper Trading Company. The company will serve as a mill representative for specialty papers including gummed tape, bags, cups, et cetera.

E. A. Hall Goes with Diamond Mills

Chicago friends of Edgar A. Hall, Jr., who learned to know him intimately during his long connections with the Pilcher-Hamilton Company of this city, reported this week that Mr. Hall has been appointed sales representative for Diamond Mills Paper Company, Inc., of Saugerties, N. Y. The company manufactures tissue specialties and manifold papers as well as a complete line of high grade tissues.

E. T. Cooke with Standard Paper Mfg. Co.

Earle T. Cooke, formerly assistant account executive and copywriter with Erwin, Wasey & Co., New York and London, has been appointed advertising manager for the Standard Paper Manufacturing Company, Richmond, Va.

Marathon Expands Its Menasha Division

Completion of New Production and Office Buildings By Marathon Paper Mills of Its Menasha Products Division Will Soon Result In Expanded Operations — New Facilities Provided For Laboratory Department.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 5, 1940—Expanded operations will soon be possible at the Menasha Products division of the Marathon Paper Mills Company at Menasha, Wis., through completion of its construction program embracing a new office building and a new factory unit, each three stories in height. The factory will be ready for operation early this month, and the office building in about six weeks, according to D. C. Everest, president and general manager of the Marathon company.

Both buildings are of reinforced concrete slab construction with brick facing. The office unit contains approximately 38,000 square feet of floor space, and is 116 by 88 feet. The factory is 220 by 110 feet.

Increased sales and resultant growth of the sales divisions, arising largely out of the constant improvement of products and from the activities of the research department has made the building program necessary, according to Mr. Everest. The Menasha Products Company is engaged primarily in the manufacture, conversion and sale of paper and paper products designed and produced to meet the requirements of the food industry for automatic and scientific packaging and satisfactory delivery to the customer. This division now handles the sale goods manufactured by the corporation at Wausau, Rothschild and Ashland, Wis.

Employment at the Menasha division has increased from 639 in 1939 to 1,049 during 1939, with payrolls now totalling 1,759,000 annually.

Buildings Completely Air-Conditioned

The office and factory buildings are completely air-conditioned. Heating will be by a combination of steam radiation and forced air, with cooling facilities for the summer. The office is equipped with new thermopane glass throughout to facilitate air-conditioning, and will have the newest and most modern lighting equipment.

In the basement of the office building will be a display and sample room for all products of the Marathon company, as well as rooms for distribution of mail, and for mimeographing, multigraphing and storage of supplies.

The first floor will have a lobby and reception room, general administrative offices, and quarters for the purchasing agent, traffic manager, engineer, and production and personnel managers and credit union. The entire second floor will be used by the sales and promotion department. The art department will be housed on the third floor, with all natural lighting from the north. An automatic light meter will provide artificial light when natural light grows dim. This floor also will house the stenographic, accounting, cost and credit departments.

New Facilities and Equipment Provided

In the new factory building, the basement will be used for storage of raw materials. The first floor provides additional space for the carton division, permitting streamlining of production facilities. The company has made extensive purchases of new machinery. Equipment in the old factory will be revised in order to re-route production. These rearrangements also will facilitate shipping and storage.

Complete new facilities for the laboratory and research department are being provided on the second floor, which also will house the expanding parafilm and specialty bag departments. Congestion in other departments also will be relieved by the added factory space.

Building May Be Expanded Later

The office building has been designed so it can be increased to five stories later. The construction work is being done by the Permanent Construction Company, Milwaukee, Wis., and the architects were Eschweiler and Eschweiler, Milwaukee.

Employees held a dance on the second floor of the new factory building last Saturday evening, and games and other entertainment on the first floor, to celebrate the expansion program. Walter Strong was chairman of the arrangements.

To Consider Bids for Bayless Corp.

[FROM OUR REGULAR CORRESPONDENT]

AUSTIN, Pa., February 5, 1940—The Court of Common Pleas of Potter County, in Coudersport, Pennsylvania, will, on February 19, 1940, consider bids for the plant and property of the Bayless Pulp and Paper Corporation of Austin, Pa., as a going concern. It is understood that such bids shall be sufficient to clean up the liabilities of the receivership and assure full operations of the property.

The plant at Austin is exceptionally well located as to fuel supply and outbound freight rates and has a productive capacity of about sixty-five tons daily of sulphite wrapping and specialty papers. The mill is a complete sulphite pulp and paper plant, with the sulphite mill having the Jensen acid system, three digesters capable of producing about seventy-five tons of pulp daily. There are five large, tile-lined Bellmer bleachers capable of bleaching over one hundred tons of pulp daily; and the stock preparing plant is equipped with stock de-fibering equipment. In the beater room there are ten beaters and four jordans. The plant houses three Fourdrinier paper machines of 136, 116 and 66 inches respectively.

Stanley C. Bayless who has been acting as general manager and receiver of the corporation has tendered his resignation as receiver. Mr. Bayless has a large acquaintance in the coarse paper field and is well and favorably known in the trade. No information is obtainable at this time in regard to Mr. Bayless' future plans; however, it is known that he is a large creditor of the receivership.

Further information at this writing may be obtained from the company at Austin, Pa.

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Preliminary Program for Convention of National Paper Trade Association

Waldorf-Astoria Hotel, February 19-22, 1940

Sunday, February 18

10:30 A.M. Executive Committee Meeting—Pillement Suite.

Monday, February 19

10:00 A.M. Wrapping Division Meeting, Vice-President C. E. Roach presiding—East Foyer. Open discussion of Commodity lines led by Committee Chairmen.

10:00 A.M. Fine Division Meeting, Vice-President P. W. Lesh presiding—Jade Room. Presentation of Annual Survey with graphic charts thrown on screen.

12:30 P.M. Wrapping Paper Merchandising, Committee Luncheon, W. K. Bunting, Chairman—Assembly Room N.

2:00 P.M. N. P. T. A.—General Session, President F. T. Jamison presiding—Jade Room. Open to manufacturers and guests. Opening of the Convention. Address—Arthur A. Hauck, President University of Maine. Address—Paul T. Truitt, Chairman Interdepartmental Committee on Interstate Trade Barriers. Report of Fair Labor Standards Committee, A. W. Leslie, Chairman.

4:30 P.M. Wrapping Division Governing Committee, Vice-President C. E. Roach presiding—Assembly Rooms L M.

7:00 P.M. Dinner to new members. Longchamps Restaurant, 42nd and Lexington avenue. Tickets $2.00. New members complimentary.

Tuesday, February 20

10:00 A.M. Wrapping Division Meeting, Vice-President C. E. Roach presiding—Jade Room. Address—V. E. Vining, Director Department Store Sales Westinghouse Electric and Manufacturing Company. Survey Report of 1939—J. H. Londergan, Director Statistical Research. Field Report—R. H. Ziegler, Assistant Secretary.

10:00 A.M. Box Paper Meeting, G. J. E. Buell, Chairman—Assembly Room N.

2:30 P.M. Fine Paper Meeting—Jade Room. Subject—Writing Papers—P. A. Stuhlreyer, Chairman.

4:30 P.M. Fine Paper Governing Committee, Vice-President P. W. Lesh presiding—Assembly Room N.

8:30 P.M. Board of Directors, President F. T. Jamison presiding—Assembly Rooms L M.

Wednesday, February 21

10:00 A.M. Wrapping Division Meeting, Vice-President C. E. Roach presiding—Jade Room. Address "The Retailer's Point of View", V. C. Redd, Cynthiana, Ky. Report of Governing Committee. Report of Merchandising Committee, W. K. Bunting, Chairman. Report and discussion on Divisional activities.

2:30 P.M. Fine Paper Meeting, Vice-President P. W. Lesh presiding—Jade Room. Report of Governing Committee. Discussion of Book Papers, B. E. Reeves, Chairman.

4:30 P.M. Conference of Local Secretaries and Executives with National Counsel—Assembly Rooms J K.

Thursday, February 22

10:00 A.M. Annual Meeting—N. P. T. A. President F. T. Jamison presiding—Jade Room.

Calls for Wood Pulp Survey

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 7, 1940—Senator McNary of Oregon, minority leader in the Upper House, has introduced a resolution calling for a survey by the United States Tariff Commission of domestic production and importation of wood pulp or pulpwood. This is similar to resolutions introduced in the past on the same subject by former Senator Borah of Idaho. The resolution which was referred to the Senate Committee of Finance is as follows:

"That the United States Tariff Commission, under authority conferred by section 332 of the Tariff Act of 1930, is directed to investigate and report to the Senate all facts relating to wood pulp or pulpwood, showing the volume of importations compared with domestic production and the conditions, causes, and effects relating to foreign competition, and all other facts showing the differences in, or which affect competition between, the production of wood pulp or pulpwood in the United States or that imported in the principal markets of the United States; such report to cover the period up to July 1, 1939, and to be made to the Senate not later than May 15, 1940."

State Forestry College to Hold Dinner

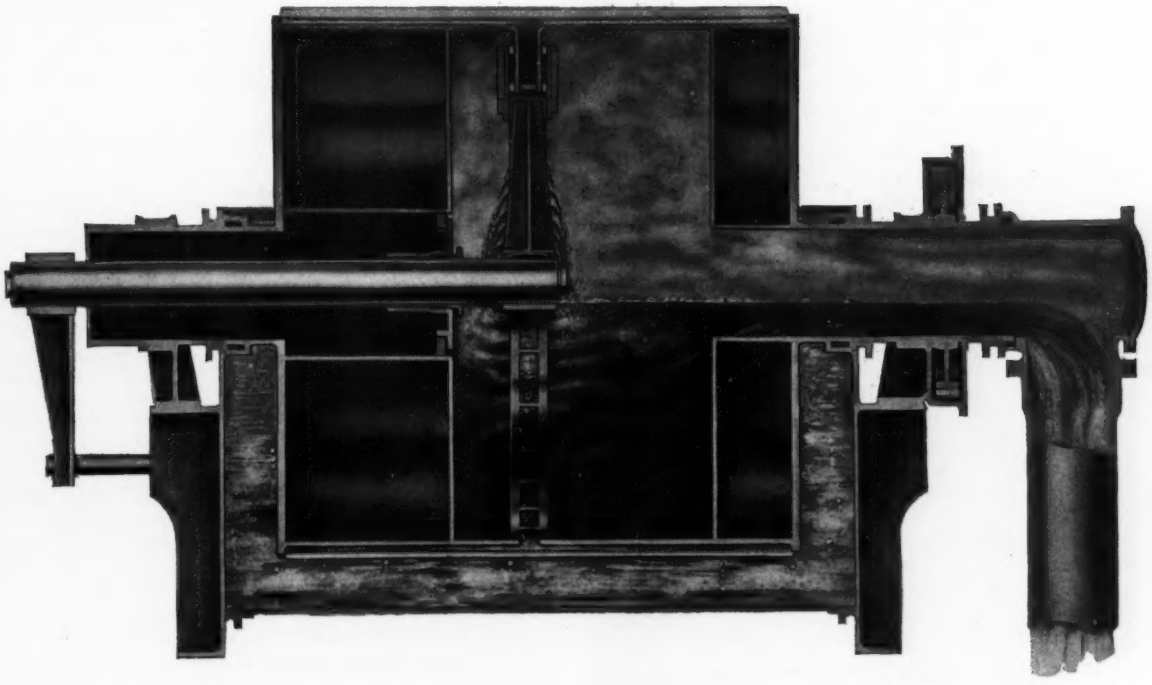
The meeting of the pulp and paper alumni of the New York State College of Forestry will be held as usual during the week of the annual convention of TAPPI. A dinner will take place at the Sacher Restaurant, 303 Madison avenue, New York City, at 6:00 P.M., February 21.

As has been the case in previous years, there will be no formal speeches or program and the meeting will be in the nature of an informal get together and a renewal of old friendships.

Arrangements are being made by a committee of which the chairman is:—William R. Willets, '25, Paper Development Laboratory, Titanium Pigment Corporation, 99 Hudson street, New York City.

RING VALVE DECKER

Patents Applied for.



Whatever Volume the Sheet Will Pass This Decker Will Easily Handle

12,000 g.p.m. is the design capacity obtainable with an 8-foot diameter Oliver Ring Valve Decker! A very high capacity, yes, but a study of the two drawings reveals why such a capacity can be a fact. Note the large drainage sections, the large "ring valve" approximating the size of the drum, large discharge ports, and large trunnion. These passageways, with minimum hydraulic restrictions from sheet through trunnion, are evidence of design for new highs in water capacity and deckering of pulp.

The Oliver design with center drainage from each of the sections, means shortest travel for the liquid, minimum resistance to flow and the vacuum fully effective to the ends of the sections.

It can be safely said that this Ring Valve Oliver Decker will handle as much liquid as the sheet itself will allow to pass.

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Seek Testimonial Fund for the Founding of the Herty Forest Institute

In a sincere effort to pay suitable tribute, in a manner which would be pleasing to him, according to G. M. Bazemore, chairman of the committee, friends of the late Dr. Charles H. Herty, would perpetuate those humanitarian services which were closest to his heart by now establishing, at Waycross, Ga., the Herty Forest Institute.

The purpose of the Institute according to Mr. Bazemore is to carry out Dr. Herty's ideal of making forestry knowledge available to the interested layman, especially to the youth of today, thereby creating a healthy interest in the conservation and proper utilization of our forests as a source of steady income.

When Dr. Herty demonstrated final proof of the suitability of southern woods for making commercial newsprint paper, he made this characteristic remark:

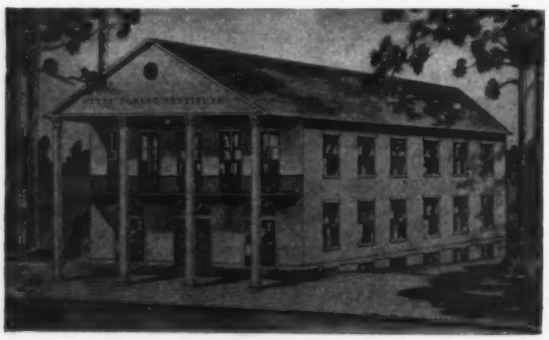
"I don't think of this thing in terms of dollars and cents. The development of this industry is going to mean the elimination of one-room houses for families . . . better food for those who are living on cornbread and occasional meat . . . better clothes for those who go in rags today."

To paper men, financiers and laymen, Dr. Herty demonstrated and publicized the potential benefits—economic and social—of a wider commercial utilization of southern woods. It amounted to a one-man crusade. The $6,500,000 Lufkin mill, dedicated to him, is one direct result. Since 1936, 17 pulp and paper mills have been established in the South, at an investment of more than 100 million dollars.

It is not anticipated that any friend or admirer of Dr. Herty, or beneficiary of his work, will require urging to join in honoring his memory at this time by subscribing open-handedly and spontaneously to this Testimonial Fund. $50,000 is the minimum amount required to establish the Institute. Dr. Herty kept faith with the South. He gave of everything he had. Let us now keep faith with him is the concluding appeal of Mr. Bazemore in a notice of this movement recently sent out.

Gov. Rivers Is Honorary Chairman

The honorary chairman for the Dr. Charles H. Herty Testimonial Fund for the Founding of the Herty Forest Institute is Hon. E. D. Rivers, Governor of Georgia. The movement is sponsored by the Slash Pine Forestry Association of which Dr. Herty was chairman of the advisory committee and in which his interests were actively centered at the time of his death in 1938.



Drawing of Remodeled Building.

An option has been secured to purchase the five-year-old brick structure at Mary and Remshart streets in down-town Waycross, which is the geographical center of the southern pine territory. Plans call for the remodeling of the structure along the lines shown in the illustration. It is estimated that this building can be acquired and paid for, remodeled, fully equipped and a three-year cooperative educational program financed for $50,000. The program would be sustained thereafter by nominal membership fees.

Subscriptions made now are payable in convenient installments. A suggested basis for a three-year subscription is as follows:—

SUGGESTED BASIS FOR THREE-YEAR SUBSCRIPTION

Total (3-year) subscription	Amount payable per year for 3 years	Equivalent per day	What this Will Provide—
$1,000	$333.33	Less than $1	Library furnishings and equipment other than books
$1,200	$400.00	$1.07	Motion picture sound track, with generator, amplifiers, and other necessary equipment, to carry the visual education program to thousands who will not be reached otherwise
$2,400	$800.00	$2.14	Salary of a trained Forester for one year, to establish Herty Demonstration Forests.
$500	$166.66	45 cents	One-third of year's salary of an Assistant Forester.
$100	$33.33	7 cents	Motion picture films and educational material.
$36	$12.00	3 cents	(Suggested as minimum "popular" subscription.)
$5,000	$1,666.66	Less than $3	Will pay for remodeling of building.

What the Institute Would Provide

The Herty Forest Institute would provide a museum for permanent exhibits representative of the Naval Stores industry, paper mills, the lumber industry, state and federal exhibits of forestry, transportation, biological exhibits of the Okefenokee Swamp, etc. It would provide also a wide-spread educational program in cooperation with other existing forestry agencies, including State, Federal and County, as well as land owners and others.

Dr. Herty's Last Message

An ardent conservationist, Dr. Herty carried on an untiring crusade for fire protection and systematic "farming" of forests. In his last message to Slash Pine Forestry Association of Waycross, of which he was Chairman of the Advisory Board, Dr. Herty stated: "If our forests are to be a source of steady income, we must protect them and manage them so as to increase their productivity for the years to come. Keep up the good work!"

URGE FEDERAL PURCHASE OF CUTOVER LANDS

(Continued from page 9)

ids dam, $1,893.68, Jersey dam, $468.98, Tomahask dam, $2,350.01, Grandfather dam, $17,691.95, Alexander dam, $4,458.05 and Merrill dam, $235.27.

Rhinelander Paper Company, $2,018.17; Tomahawk Pulp Company, $925.66; Tomahawk Kraft Paper Company, $3,718.83; Wausau Paper Mills Company, $563.40; Marathon Paper Mills, $3,871.77; Mosinee Paper Mills Company, $3,306.32; Consolidated Water Power and Paper Company—Stevens Point dam, $6,711.81, Biron dam, $9,586.36, Wisconsin Rapids dam, $12,601.55.

Wisconsin River Pulp and Paper Company, $8,268.97; Whiting-Plover Paper Company, $187.28; Nekoosa-Edwards Paper Company—Centralia dam, $6,165.61, Port Edwards dam, $6,721.17, Nekoosa dam, $6,918.12; Wisconsin Power and Light Company—Wisconsin Dells dam, $8,936.76; Prairie du Sac dam, $15,220.52.

Elmer H. Jennings Addresses Rotary Club

Officials of the Thilmany Pulp and Paper Company and the Combined Locks Paper Company were guests of the Rotary club at Kaukauna, Wis., at a luncheon last week at which Elmer H. Jennings, vice-president of Thilmany, was the speaker. He described the attitude of industry toward government regulation. "Industry is far from being united on common objectives," he said, "but today industry feels the government is right in introducing certain economic changes. But cooperation between government and industry is needed so the latter can get its breath between successive changes."

Unemployment, the most serious problem ten years ago, is still the most serious today, Mr. Jennings declared. Its only permanent cure is by industry itself, and industry evidently lacks confidence in government measures.

Changes made by the Thilmany company were described by the speaker, who said it has been necessary to add new items to keep up with changing trends. These have been largely in the converting department which is being expanded by taking over the former Union Bag and Paper Company plant and using it for both converting and storage. Since 1932, the company has expanded its employment from 585 to 950 workers.

Estate of Charles A. Babcock Over $2,000,000

The estate of Charles A. Babcock, president of the Wisconsin River Paper and Pulp Company, who died January 19, is between $2,000,000 and $3,000,000, according to his will filed in the probate court at Oshkosh, Wis. Most of it is left in trust to three grand-daughters, and the income from it will go primarily to his daughter, Mrs. Milsom Mory. Other bequests included $25,000 each to Theda Clark hospital, Neenah, Wis., and a brother, Guy O. Babcock, Wisconsin Rapids, Wis., and $5,000 to George Littlefield and $2,500 to Frances Molynex, his employes. Mrs. Babcock preceded him in death several years ago.

Thilmany Leading Safety Contest

Thilmany Pulp and Paper Company's upper mill at Kaukauna, Wis., is leading Group B, 33 mills in the United States and Canada, in the National Safety Council contest, according to the report covering the period from July through December. The mill has run 562,748 man hours with but one lost-time accident and on February 1 had gone 142 days since this accident occurred, according to L. C. Smith, personnel director. During the calendar year 1939 the upper mill had but two lost-time accidents with a total exposure of 1,067,219 man hours.

Paper Merchants Elect Officers

[FROM OUR REGULAR CORRESPONDENT]

COLUMBUS, Ohio, January 29, 1940—The Central States Paper Trade Association held its annual meeting and election of officers on Thursday, January 18, 1940, at the Deshler-Wallick Hotel, at which time the following officers were elected for the coming year: Jerome Sturm of The Diem & Wing Paper Company, Cincinnati, President; A. J. Ulrich, of Scioto Paper Company, Columbus, Ohio, vice president; John L. Richey, Cincinnati, secretary-treasurer.

A very interesting meeting was held and on a canvass of the inventory situation among paper merchants of the Middle West, one fact very definitely developed—that inventories on dollar value were only about 10 per cent up over 1938, and all members felt that the coming year would be a substantially better and more profitable one than 1939.

The following day, in the same place at Columbus, the Middle States Wrapping Paper Association held its annual meeting and elected for president during the coming year T. Floyd Smith, Jr., of the Louisville Paper Company, Louisville; for vice president, C. V. Jewell of the Capital Paper Company, Indianapolis, and for secretary-treasurer, John L. Richey of Cincinnati.

A very interesting program was had in this meeting also and a canvass was made on the subject of merchant inventories, the highest inventory figure reported being 25 per cent above normal, with the average around 15 per cent above normal, and in this group also expectations were good for at least a modest increase in volume and profit in 1940 over 1939.

The Central States Paper Trade Association meeting had as visitor J. Harry Londergan, assistant secretary of the National Paper Trade Association, who gave a very interesting and instructive exposition of the work of the National Paper Trade Association.

Robert Ziegler, newly appointed secretary of the Wrapping Paper Division was present at the Central States meeting and spoke at some length at the Middle States Wrapping Paper Association meeting, setting forth a tentative plan for cooperative merchandising for members of the National Paper Trade Association, which plan was approved in principle by all present, and as the program is refined and enlarged upon, possibly by the February convention, it is thought that the Middle State Wrapping Paper Association territory might be one of the first proving grounds for the program to further improve the merchandising service of Wrapping Paper merchants in paper, paper products and twine.

Both Mr. Lindergan and Mr. Ziegler were congratulated upon the good work they are doing with the National Paper Trade Association.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 7, 1940—Mudge Company has been awarded the contract for furnishing the Government Printing Office with 308,178 pounds (878,000 sheets) of 50 per cent rag, 38 x 48 white ledger paper at 8.71 cents and the Import Paper Company will furnish 6,500 pounds (200,000 sheets) of 21 x 32 blue sulphate manifold paper at 8.7 cents. Bids for both of these items were received on January 12.

Cauthorne Paper Company will furnish 2,000 pounds of white stereotype molding paper in 24 inch rolls at 8.9 cents. Whitaker Paper Company will furnish 40,000 pounds of yellow sulphite writing paper in 38 inch rolls at 5.25 cents and Stanford Paper Company will furnish 7,115 pounds (153,000 sheets) of 50 per cent rag, 21 x 32 blue bond paper at 10.39 cents. Bids for all of these items were received on January 5.

R. P. Andrews Paper Company will furnish 21,056 pounds (752,000 sheets) of 50 per cent rag, 10½ x 16 white M. F. lithograph paper at 9.43 cents, and Barton, Duer & Koch Paper Company will furnish 589 pounds (6,300 sheets) of 50 per cent rag, 32 x 42 yellow bond paper at 24 cents. Bids for these items were received on December 29.

R. P. Andrews Paper Company will also furnish 6,000 pounds of plate wiping paper in 24 inch rolls at 7.7 cents, bids for which were received on December 27.

The Printing Office has received the following bids for 211,825 pounds of 50 per cent rag, buff ledger paper; R. P. Andrews Paper Company, 8.68 cents; Barton, Duer & Koch Paper Company, 9.33 cents; Stanford Paper Company, 10.09 cents; Aetna Paper Company, 9.97 cents; Paper Corp. of U. S., 10.93 cents; and Butler Company, 9.16 cents.

For 244,214 pounds different size binders board; R. P. Andrews Paper Company, 4.785 cents; Barton, Duer & Koch Paper Company, 5.2135 cents; and Consolidated Paper Company, 5 cents.

For 175,500 pounds of 50 per cent rag, 38 x 48 white ledger paper; Aetna Paper Company, 9.49 cents; R. P. Andrews Paper Company, 9.08 cents; Barton, Duer & Koch Paper Company, 9.23 cents; Stanford Paper Company, 9.75 cents; Mudge Paper Company, 8.549 cents; and Paper Corporation of United States, 10.76 cents.

For 1,376 pounds (8,600 sheets) of 25 x 38 ivory laid antique book paper; R. P. Andrews Paper Company, 13.5 cents; Barton, Duer & Koch Paper Company, 13.5 cents; and Stanford Paper Company, 15.5 cents.

Dill & Collins Issues New Portfolio

PHILADELPHIA, Pa., February 5, 1940—"Color" is the title of a new portfolio now being distributed by Dill & Collins through their local agents. Sparkling with color, both stock and inks, this new portfolio is of unusual design and practical value in demonstrating the use of paper and design. Measuring 9¼ x 12 inches, it is plastic bound and shows the new Canterbury text, De and Se Antique and improved Suede book. The new Canterbury text is surface-sized, making it suitable for both letter press and offset. The De and Se Antique is intended to supply the need for a good color line in its grade.

Massachusetts Lets Contracts

BOSTON, Mass., January 29, 1940—The Commonwealth of Massachusetts has made the following awards for paper for the six months period beginning January 1, 1940.

Tileston & Hollingsworth Company approximately 125,000 lbs. M. F. book. Name of stock State. January 1 to March 30, $6.50 cwt., under one ton; $6.25 cwt., over one ton; $5.45 over five ton. April 1 to June 30, $7.00 cwt., under one ton; $6.75 over one ton; $5.95 over five ton.

Whiting Paper Company approximately 150,000 lbs. 25 per cent rag book. Name of stock Mutual. $10.99 cwt., white; $11.74 cwt. colors.

Tileston & Hollingsworth Company, approximately 100,000 lbs. No. 4 sulphite bond. Name of stock TIHO. January 1 to March 30, $6.10 cwt. white; April 1 to June 30, $6.60, white. January 1 to March 30, $6.85 colors; April 1 to June 30, $7.35 colors.

Whiting Paper Company approximately 10,000 lbs., 100 per cent rag ledger. Name of stock No. 1 Linen Ledger. $24.59 cwt. white; $25.34 cwt. colors.

Whiting Paper Company approximately 30,000 lbs. No. 1 sulphite ledger. Name of stock Legion. $7.63 cwt. white; $7.63 colors.

John Garter & Co. Inc. approximately 6,000 lbs. cover paper, antique finish. Name of stock International. Less than 250 sheets, $11.25 cwt., colors and white; $14.25 black; $15.50 red. Over 250 sheets $7.50 cwt., colors and white; $9.50 black; $10.25 red.

Percy D. Wells Inc. approximately 40,000 lbs. No. 3 index bristol. Name of stock Darien. Under four cartons, white, $7.75 cwt.; four cartons to 10,000 lbs., white, $7.50 cwt.; 10,000 lbs. to 20,000 lbs., white, $7.35 cwt. Under four cartons, colors $8.75 cwt.; four cartons to 10,000 lbs., colors, $8.50; 10,000 lbs. to 20,000 lbs., colors $8.35 cwt.

Discontinues Kraft Appeals

The Administration has decided against further appeals of the kraft paper valuation cases in which it has been contended that the proper dutiable home market value of the paper is about one cent per pound higher than the actual export selling price. The importers argue that the Swedish sellers have established such a control over the home market that there is no "freely offered" value on which duty can be collected and that the proper dutiable value is the lower export value. It is because of this claim that the Import Committee of the American Paper Industry is urging that legislation be enacted to prevent such practices by foreign producers by which they avoid the plain intent of the tariff law. If the Government follows the same procedure in several hundred other pending cases, importers of kraft paper for nine years past will recover about $750,000 in duties which they were required to pay before they could begin suit for recovery.

A further result will be the admission of future shipments of Scandinavian kraft at about $4 per ton less than has been paid hitherto.

There is nothing to indicate what considerations of trade or international policy were involved, or to what extent they may have been instrumental, if at all, in the present decision of the Government to cease further efforts to prosecute these cases.

For

Lower Permeability

in Wax Treatments, Paper

Makers are using

R·C·I *Synthetic* RESINS

Greater water resistance and greater adhesion are some of the other advantages of substituting resin for paraffin in wax-treating paper.

Synthetic resins are also being extensively used in the paper industry to achieve clearer, paler overprint varnishes and lacquers and more efficient coatings.

Inquiries are invited concerning the use of Reichhold synthetic resins in the paper industry.

REICHHOLD CHEMICALS

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CONSTRUCTION NEWS

Tomahawk, Wis.—Tomahawk Pulp Company has completed plans for improvements in mill, including foundations for equipment and other work, and will proceed with construction at once. General contract has been awarded to the Koepke Construction Company, Appleton, Wis. No estimate of cost has been announced. L. A. DeGuere, Wisconsin Rapids, Wis., is consulting engineer.

Plainfield, N. J.—The Sanitary Products Corporation of America, Inc., Lewis and Ashland streets, Philadelphia, Pa., manufacturer of paper and fiber products, has concluded negotiations for purchase of industrial property at 633-55 North avenue, Plainfield, improved with a one-story building totaling about 50,000 square feet of floor space. Structure will be improved and equipped for new branch plant. Company will take immediate possession and will have plant ready for operation at early date.

Detroit, Mich.—The Consolidated Paper Company, Monroe, Mich., has authorized immediate replacement of damage to mill on Roesser street, River Rouge, near Detroit, recently caused by fire resulting from an explosion. The plant is used for the production of automobile panel board, and will be closed for a week or more for necessary reconstruction, during which time the company will make shipments of material from its other mill equipped for similar manufacture.

Elizabeth, N. J.—Peter J. Schweitzer, Inc., 994 Newark avenue, manufacturer of cigarette, manifold, carbon, bible and other special papers, has awarded general contract to Nicholas D'Elia, 2761 Hudson boulevard, Jersey City, N. J., for one-story and basement addition to mill, about 90 x 150 feet, recently referred to in these columns, and work on superstructure will be placed under way at once. It is reported to cost approximately $100,000, including equipment. William E. Lehman, 972 Broad street, Newark, N. J., is architect.

New Haven, Conn.—The Boxboard Products Company, Inc., recently organized with capital of $25,000, plans early operation of local plant for the manufacture of paper board specialties. New company is headed by James Barbuto and Domenick L. Marone, both of New Haven.

Chicago, Ill.—W. C. Ritchie & Co., 8855 South Baltimore avenue, manufacturer of paper boxes, fiber cans and containers, etc., has plans under way for new plant unit at 8900 South Baltimore avenue, consisting of a three-story and basement structure, reported to cost over $70,000, including equipment. Bids will be asked soon on general erection contract and award is scheduled to be made early in March. Shaw, Naess & Murphy, 80 East Jackson boulevard, are architects.

Kapuskasing, Ont.—The Transcontinental Paper Company, Ltd., 25 King street, West, Toronto, Ont., has concluded negotiations for purchase of tract of land at Kapuskasing and is reported planning early construction of a new pulp and paper mill at that location. It will consist of several one and multi-story units, to be equipped for large capacity, with storage and distributing buildings, machine shop, power station and other mechanical structures. Entire project is estimated to cost over $500,000.

Chicago, Ill.—Central States Graders, Inc., 160 North LaSalle street, has been organized with capital of 20 shares of stock, no par value, to deal in paper goods. New company is represented by Samuel Yoelin, 160 North LaSalle street, Chicago, attorney.

New York, N. Y.—The Melo Envelope and Paper Company, Inc., has been organized with capital of 200 shares of stock, no par value, to deal in paper products of various kinds. New company is represented by Samuel Hachstein, 150 Broadway, New York, attorney.

New York, N. Y.—The National Transparent Manufacturing Company, 413 West Broadway, manufacturer of envelopes, etc., has leased space in building at 28 West Twenty-fifth street, and will occupy for converting plant. It is understood that present plant will be removed to new location.

Everett, Mass.—The Metropolitan Lithograph and Publishing Company, Bow street, manufacturer of paper specialties, has plans for new one-story addition to plant, including improvements in present building. Cost reported about $20,000, with equipment. William P. Hatch, 60 State street, Boston, is architect.

East Walpole, Mass.—Bird & Son, Inc., manufacturer of wall board, press board, building papers and other stocks, has begun erection of new addition to plant at East Walpole, recently referred to in these columns, to be one-story, about 30 x 500 feet, reported to cost approximately $100,000, with equipment. MacDonald Belvin, Inc., 88 Broad street, Boston, Mass., has the general contract for erection. It is proposed to have the structure ready for service in the spring.

Toronto, Ont.—Canada Glazed Papers, Ltd., 45 Murrich street, manufacturer of coated paper stocks, will expand plant capacity about 30 per cent at present location, where additional floor space has been leased, making a total of 32,500 square feet of floor area now occupied by the company. Equipment and facilities will be installed at once. The company began local operations early in 1939, and since that time has been expanding rapidly.

Brisbane, Australia—The Australian Paper Manufacturers, Ltd., Sydney, New South Wales, Australia, has arranged with the Bretts Wharves and Stevedoring Company, Pty., Ltd., Brisbane, Queensland, to use a tract of land near Bretts Wharf, Hamilton district, Brisbane, for a new mill for the production of pulpwood, on which work will proceed at once. The plant is designed primarily for the present emergency war period and will be equipped for the recovery of waste hoop pine and other wood for pulp service. The waste wood, including sawdust, will be processed for this purpose at the mill, which will have complete facilities for chipping, baling, etc. The output, in block form, will be used in different mills of the company in other States of Australia. It is reported to cost in excess of $100,000, with equipment.

Kenneth Brown Collings—TAPPI Annual Luncheon Speaker

In celebrating its twenty-fifth anniversary the Technical Association of the Pulp and Paper Industry has arranged one of its finest programs to be presented at the Roosevelt Hotel, New York City, on February 19-22, 1940. Nearly one thousand individuals are expected to attend.

Following three and one-half days of important technical sessions the convention will be topped off with the annual luncheon. On this occasion the TAPPI medal, presented to an individual who has made outstanding contributions to the technical advancement of the pulp and paper industry, will go to Otto Kress, Technical Director of the Institute of Paper Chemistry, Appleton, Wis. The presentation will be made by Ernst Mahler, vice president of the Kimberly-Clark Corporation, Neenah, Wis.

Comments on the beginnings of the association will be made by Harry Fletcher, vice president of the Fletcher Paper Company, Alpina, Mich., and first president of TAPPI. Starting with less than one hundred members the association has grown steadily until it now has about one thousand eight hundred members.

D. Clark Everest, president of the American Paper and Pulp Association, will be included among the speakers.

The guest speaker will be Kenneth Brown Collings, war correspondent, author and aeronautical authority, who will tell the uncensored story of What Is Really Happening in Europe. Mr. Collings was "Liberty's" flying correspondent in Ethiopia and was a co-author with Lowell Thomas, of "With Allenby in the Holy Lands". He was one of the few correspondents admitted to Germany after the outbreak of war. He has searched carefully for the real facts in the current international crisis as seen from German, Italian and what was Polish territory. One of his dramatic experiences, recently, was to be captured and held by the Russians as a spy on the East Prussian front. Since Mr. Collings works as a free-lance writer, his interpretation of events are colored only by his desire to portray actual conditions as he has observed them personally with vividness and truth. He has long been one of the lecture platform's most convincing and popular speakers.

There will also be an interesting exhibit featuring the proposed summer tour to the Pacific Coast by TAPPI in August 1940.

Richard S. Duell Goes To Hudson Falls

[FROM OUR REGULAR CORRESPONDENT]

HUDSON FALLS, N. Y., February 5, 1940—Announcement is made here of the transfer of Richard S. Duell from the Chicago factory laboratory of the Union Bag and Paper Corporation to the local plant where he will fill a similar position. He will occupy the position held by Lawrence T. Ross who was recently promoted assistant to Karl R. Karlson. Mr. Duell entered the employ of the company in 1936 directly after his graduation from Syracuse University where he completed an extensive training in the pulp and paper division as well as majoring in chemical engineering. In addition to his training and experience in connection with his activities in Chicago he has had a wide experience in the testing of all classes of papers and materials acquired during vacation periods when he worked with his father, chief paper tester for the International Paper Company.

"NON-USERS ARE THE LOSERS"

FINISH AND SPEED

TENAX FELTS

GREETINGS to FERNANDINA

As makers of *TENAX FELTS* we extend Congratulations to Rayonier as its new mill at Fernandina, Florida, goes into operation. . . . *TENAX FELTS* have made good and technical men and mill superintendents join in specifying them more and more. year after year.

"Non-Users Are The Losers"

LOCKPORT FELT COMPANY

NEWFANE, N. Y.—U. S. A.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for the Week Ending February 7, 1940

	High	Low	Last
A.P.W.	2¾	2¼	2¾
Armstrong Cork Co.	40⅞	39¾	40
Celotex Corp.	10⅜	9⅞	10
Celotex Corp., pf.	65	64	65
Certain-Teed Products Corp.	6⅞	6⅜	6¾
Certain-Teed Products Corp., pf.	31½	29⅞	29⅞
Champion Paper & Fibre Co.	23⅞	23¾	23⅞
Champion Paper & Fibre Co., pf.	103½	103½	103½
Congoleum-Nairn Co.	23⅛	22⅝	23⅛
Container Corp. of America	16½	16⅛	16¼
Continental-Diamond Fibre Co.	6¾	6¾	6¾
Crown-Zellerbach Co.	16⅝	15⅞	16½
Crown-Zellerbach Co., pf.	91¾	90½	90⅝
Flintkote Co.	19¼	18½	19⅛
Robert Gair	3½	3¼	3¼
Robert Gair, pf.	14⅝	14¼	14½
International Paper & Power	13¾	12½	13⅜
International Paper & Power, pf.	58⅛	54	58½
Johns-Manville Corp.	72½	71	71
Johns-Manville Corp., pf.	126½	125	125
Kimberly Clark Corp.	35¾	35	35
MacAndrews & Forbes	34	34	34
Masonite Corp.	37¾	37¼	37¾
Mead Corp.	10½	10	10½
Mead Corp., pf.	55	53¼	55
Paraffine Companies, Inc.	42	42	42
Paraffine Companies, Inc., pf.	101	101	101
Rayonier, Inc.	18½	17¾	18
Ruberoid Co.	18½	18⅜	18⅜
Scott Paper Co.	47	46½	46½
Sutherland Paper Co.	29¼	29	29⅛
Union Bag & Paper Corp.	14¼	13¼	13⅜
United Paperboard Co.	4¾	4¼	4½
U. S. Gypsum Co.	86⅝	84½	84½
U. S. Gypsum Co., pf.	179	179	179

New York Curb Exchange

High, Low and Last for the Week Ending February 7, 1940

	High	Low	Last
American Box Board Co.	7	6¼	7
Brown Co., pf.	23½	22	23½
Great Northern Paper	43	41½	43
National Container Corp.	11⅛	10⅞	11⅛
St. Regis Paper Co.	3⅛	2⅞	2⅞
St. Regis Paper Co., pf.	72½	71¼	71¾
Taggart Corp.	5⅛	5	5

Otter River Mills Sold

GARDNER, Mass., February 5, 1940—Sale of the plant of the Otter River Mills, Inc., at Otter River idle since the flood and hurricane of 1938, to the New England Pulp Paper Company of Boston was announced by Clarence H. Christian of this city, president and treasurer. The purchasing firm, which will reclaim pulp from waste paper, is now making repairs and alterations to the plant and expects to start active operations with a crew of between 15 and 20 operatives shortly after March 1.

Robert Travers of Worcester is president and Franklin E. Smith of Boston is treasurer of the concern which has been in existence for a number of years.

The mill was badly damaged in the floods and the hurricane of 1938. Mr. Christian, head of the plant since 1934, is now connected with a Jersey City concern. The Otter River Board Company was organized and operated for a number of years by the late John P. O'Brien. It became the Otter River Mills, Inc., in 1934. The plant manufactured binder board for book covers.

Consolidated Box Co. Gets Refund

[FROM OUR REGULAR CORRESPONDENT]

SOMERVILLE, Mass., February 5, 1940—The Consolidated Paper Box Company has received a refund of $11,121 on a Federal tax on sales paid during 1939.

Donnacona Earnings Higher

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 5, 1940—The financial statement of the Donnacona Paper Company for the fiscal year ended December 31, 1939, shows higher earnings and an improvement in balance sheet position. Operating profit at $766,053 compares with $501,700 for 1938, $600,275 for 1937. This operating profit was equal to 2.28 times combined bond and note interest before depreciation, 1.03 times after depreciation. After interest, depreciation and tax provision, net profit at $8,985, compared with $2,232 for 1938, net being equal to 2.3c a share on the combined A and B, against 0.6c in 1938. In the past year depreciation and depletion provision was $419,849, against $165,445 in 1938.

In connection with accounts receivable, R. P. Kernan, president, explains that "included in the current assets is the indebtedness of the Hearst Companies amounting to $739,976, of which sum $500,229 is represented by notes receivable, the payment of which has been deferred." To this indebtedness the auditors' report makes the following allusion: "We are not in a position to express an opinion as to the ultimate value of this indebtedness."

Masonite Declares Dividend

[FROM OUR REGULAR CORRESPONDENT]

WAUSAU, Wis., February 5, 1940—Directors of the Masonite Corporation, meeting last week, declared an extra dividend of 25 cents per share as well as the regular quarterly dividend of 25 cents per share on common stock, both payable March 10 to stock of record February 20. The regular quarterly dividend of $1.25 per share on the preferred stock also was declared, payable March 1 to stock of record February 20.

Oxford Declares $1.25 Dividend

The Oxford Paper Company declared a dividend of $1.25 a share on the $5 preference stock on account of accumulations, payable March 1 to stockholders of record February 15. A disbursement of $1 was made on December 1 last, at which time dividend arrears amounted to $7.75 a share.

Sylvania Earns $1,340,284

Sylvania Industrial Corporation for the year ended December 31, report a net income of $1,340,284 after charges and taxes, equal to $3.15 a share on 425,077 average shares of capital stock outstanding during the year, against $662,106, or $1.52 a share on 433,381 average number of shares in 1938.

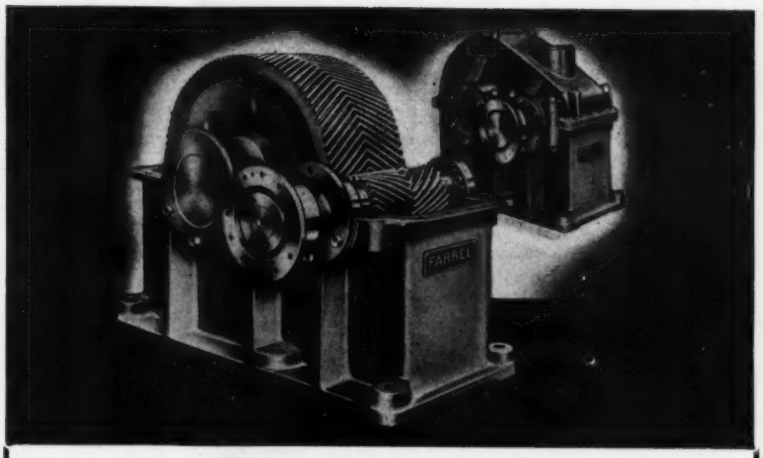
Hinde & Dauch Nets $298,209

The Hinde & Dauch Paper Company of Canada, Limited, controlled by Hinde & Dauch Paper Company, report for 1939, a net profit of $298,209, equal to 99 cents each on 299,933 capital shares, against $427,445 or $1.42 a share in 1938.

Outlook Is Brighter

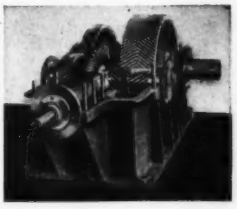
[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., February, 5, 1940—Paper mills in this district report considerably improved business conditions during 1939 with a much brighter outlook for this year. The opinion was expressed that business will continue to improve throughout the country and that this section will continue to command its share of the volume. A number of mill executives declared that progress last year was due chiefly to a more intensive sales program and that their sales budgets this year call for a definite planned increase which they expect to produce. Among the most outstanding gains last year was that of the Veldown Company, Inc., which reported a 39 per cent improvement in volume over 1938. This was due mainly to greater sales effort, planning and a reorganized sales policy. Officials said a new paper machine has just been installed which will speed up production by one-third and it is expected that the plant will operate 24 hours daily, seven days weekly. Distribution of the products is nation-wide but a more intensive selling campaign has been launched on the Pacific Coast. At the Union Bag and Paper Corporation it was stated that the present force of 1,280 employes represents a 12 per cent increase over the 1938 payroll. The last half of 1939 was considerably better than 1938 although the first half was rather weak. The improvement in business was rated at about ten per cent last year over 1938. The plant of Finch, Pruyn & Company ran on a full schedule during 1939 and this year is also expected to be a good year. It was stated at the Imperial Paper and Color Corporation that prospects look very good at the present moment. The newsprint sales department at Finch, Pruyn and Company reports that contracts have been closed which are expected to take at least 90 per cent of all the paper that the concern can produce in 1940. The balance of production is sold in the open market.



Farrel Single Reduction Unit—Type SR

FARREL GEAR UNITS



Farrel Right-Angle, Two-Speed Gear Unit.

This catalog, No. 438, gives complete descriptions, specifications, ratings and dimensions. Send for free copy.

Perform Dependably and Economically under all Conditions of Service..

The greater strength and load-carrying capacity of Farrel-Sykes continuous tooth herringbone gears are important factors in the durability and efficiency of Farrel Gear Units. The rigidity of their heavy cases eliminates deflection and vibration. Operation is smooth and quiet. They give silent, positive, uniform transmission of power.

The complete series of these units includes single, double and triple reduction units, speed change units with two or more selective speeds, right angle units and drives to suit special needs. Speed increasing units are also supplied. All offer the advantages of standardized general design, with flexibility in detail which permits variation to suit specific conditions of speed, load and service.

FARREL SYKES GEARS

FARREL - BIRMINGHAM COMPANY, Inc.
302 VULCAN STREET - - - - - - - - BUFFALO, N. Y.

The Gear with a Backbone

Brown Paper Co. Appoints Agent

The Graham Paper Company of New Orleans has been appointed the distributor in that territory of L. L. Brown's Linen Ledger, the 100 per cent new white rag permanent record paper manufactured by the L. L. Brown Paper Company, Adams, Mass.

Water Shortage Closes Some Mills

HOLYOKE, Mass., February 5, 1940—Midsummer drought conditions prevailed in the Holyoke paper mill industry today as a result of low water in the river. The Holyoke Water Power Company was forced today to cut off the water from some of the paper mills and use the steam plant for auxiliary power.

The freezing of the tributaries farther north in the Connecticut Valley watershed has brought about this condition. There has not been the customary January thaw, which normally causes an excess of water, and the frozen river and streams has reduced the amount of available water for manufacturing purposes.

PAPER TRADE JOURNAL

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Henry J. Berger
EDITOR

Vol. 110 February 8, 1940 No. 6

COMING EVENTS IN PAPER INDUSTRY

American Paper and Pulp Association, Sixty-third Annual Convention and meeting, Waldorf-Astoria Hotel, New York. February 19-22.

Technical Association of the Pulp and Paper Industry, Convention, Roosevelt Hotel, February 19-22.

Salesmen's Association of the Paper Industry, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 20.

National Paper Trade Association of the United States, Convention, Waldorf-Astoria Hotel. New York. February 19-22.

New York Association of Dealers in Paper Mills' Supplies. Annual Banquet, Hotel Commodore, New York, February 20.

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park American Hotel, Kalamazoo, Mich.

BUSINESS AND THE BUDGET

Although business men generally and the Administration are agreed on the desirability of balancing the Federal budget, there is disagreement in the means to be used to increase the national income sufficiently to balance Federal expenditures. Spokesmen for business have frequently recommended that the Administration should encourage private enterprise and higher prices to obtain higher income. On the other hand, the New Deal favors "social investment" or a lending-spending program, while President Roosevelt has also emphasized the value of armament building as contributing to a higher national income.

It has been pointed out by economists that as taxation has raised less than two-thirds of the funds of Government, a 20 per cent increase in the national income would be sufficient to balance the budget at its present 9 billion dollar level. A graduated income tax, less exemptions and higher corporate earnings would, according to this particular plan, provide an adequate income. Estimates derived from the Federal Budget indicate that an income of 60 billion dollars would produce 4 billion dollars in revenue, a 70 billion income, 5.6 billion in revenue, an 80 billion income, 7.5 billion in revenue, and a 90 billion income would provide 10 billion dollars in revenue.

From this estimate it is apparent that the present 9 billion dollar budget would be automatically balanced, without increasing present taxes or levying new taxes, with a national income of around 85 billion dollars. How to increase the national income to $85,000,000,000 (the highest on record was $80,757,000,000 in 1929) is, according to the Administration, possible through "public investment" in self-liquidating or socially productive enterprises and through increasing expenditures in armaments. It may not be clear to many business men how socially productive enterprises, such as hospitals or armaments for that matter, can be considered as self-liquidating. The general opinion of business men is more understandable. This recommends restriction of Government competition with private business and less administrative regulation of private enterprise and effect substantial economies in the expense of Government. This would check the rise of public debt, restore confidence and permit the normal flow of private capital into production and allow prices to rise in a normal manner to balance increased wage and tax costs.

The rapid increase in what has been called the "bureaucratic" regulation of business has steadily added more employees and expense to the cost of Government. In 1933 the Federal Government had 563,000 employees, in 1936 it has 805,000 and in 1940 it has 933,000. Nearly 100,000 employees were non-existent before the New Deal, such as the Tennessee Valley Authority with its 14,313 employees, the Securities and Exchange Commission with its 1,610 workers, to mention but two government agencies.

The fallacy of government investment as a means of providing prosperity is clearly summarized in this month's issue of *The Guaranty Survey*, issued by the Guaranty Trust Company of New York, which states that, "The belief that business recessions are due to failure of consumers' purchasing power is one of the least securely founded economic notions prevalent today, and one of the most unfortunate in its practical effects. The recession of 1937, according to the President's message, 'was due to a variety of causes stemming in the main from over-optimism which led the Government to curtail its net expenditures too sharply for consumers' purchasing power to keep pace'. But most of the unemployment that exists in times of economic adversity is found in the industries and trades that depend for their demand not on consumers' purchasing power but on business expansion. This expansion, in turn, depends on the confidence of business men in their ability to expand profitably. Variations in consumers' purchasing power appear to be primarily an effect, rather than a cause, of fluctuations in business activity."

In discussing the fallacy of government investment *The Survey* states in part: "It follows that efforts to strengthen consumers' purchasing power by incurring deficits are misdirected, as far as the stimulation of recovery and the prevention of recession are concerned. Relief expenditures may at times be neces-

sary from a humanitarian and a political standpoint. They may even succeed in maintaining a certain minimum level of consumers' purchasing power, as long as Government credit and the value of currency hold out. But as an economic expedient designed to improve business conditions they are beside the mark. They strike at effects, not causes. There is far less evidence to support the view that the 1937 recession was due to a breakdown of consumers' purchasing power than it reflected a failure of capital to flow freely into business expansion in the face of the numerous obstacles that had been placed in the way of profitable enterprise.

"A large-scale reduction in Government expenditures, accompanied by a lightening of the present burdens and restriction on business, is the only solution. Neither higher taxes nor continued deficits will meet the requirements of the situation. Retrenchment and a liberation of business enterprise are urgently needed, for the country cannot long afford to carry the present burden. The budget for 1940-41 does not restore the Government's finances to a condition that can be considered sound or reassuring at the present stage of business recovery."

Davies Heads Pennsalt Market Research

Well known throughout the chemical and allied fields, Richard L. Davies has been appointed manager of the newly established Market Research Department of the Pennsylvania Salt Manufacturing Company, according to an announcement by Leonard T. Beale, president.

Mr. Davies is known to many in the chemical and allied industries through his sales development work on various Pennsylvania Salt chemicals, as well as through his chemical manufacturing and usage patents, and for his contributions to trade and technical publications.

The new department is organized to make studies of the market for products now manufactured by Pennsylvania Salt, or products under contemplation; to launch the sale of new products in line with sales and management policies, and to suggest to the management what should be considered for future production and sale both in the heavy chemical and specialty departments. Market trends and opportunities will likewise be presented to the management for formulation of production and sales policies. Mr. Davies' headquarters will be at the executive offices of the Company in Philadelphia.

Newsprint Shortage in Spain

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 5, 1940—Although there has been no discussion in the press recently of the existing paper shortage in Spain, it is evidently serious judging from the fact that the local papers continue to publish at frequent intervals brief notices requesting the public to save and collect paper. During the last week in November a notice appeared in one paper to the effect that oranges would be exported to Sweden, Norway and Finland in exchange for wood pulp.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1940	1939	1938	1937	1936	1935	1934
January	.....	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	.....	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	.....	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	.....	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	.....	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	.....	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	.....	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	.....	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	.....	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	.....	96.6%	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	97.2%	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	91.1%	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average.	.....	84.9%	72.3%	80.6%	81.3%	70.5%	.....
First 4 weeks.	91.4%	77.5%	63.9%	90.3%	76.1%	65.2%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS		CORRESPONDING WEEKS	
December 23, 1939	93.9%	December 24, 1938	75.9%
December 30, 1939	76.2%	December 31, 1938	62.8%
January 6, 1940	89.1%	January 7, 1939	70.0%
January 13, 1940	94.0%	January 14, 1939	80.4%
January 20, 1940	92.2%	January 21, 1939	78.0%
*January 27, 1940	89.8%	January 28, 1939	81.4%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Dec. 23, 1939	Dec. 30, 1939	Jan. 6, 1940	Jan. 13, 1940	Jan. 20, 1940	Jan. 27, 1940
0% to 50%	30	60	50	45	35	38
51% to 100%	276	244	241	245	233	145
Total Mills Reporting..	306	304	291	290	268	183

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	81%	71%	70%

Week end. Dec. 23, 1939—81%
Week end. Dec. 30, 1939—46%
Week end. Jan. 6, 1940—65%
Week end. Jan. 13, 1940—74%
Week end. Jan. 20, 1940—72%
Week end. Jan. 27, 1940—75%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

* Preliminary figure.

Must Apply to Paper Control Dept.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 7, 1940—Applications for licenses to import pulp, pulpwood, and esparto in the United Kingdom have to be made direct to the Paper Control Department of the Ministry of Supply, according to a report from the Office of the American Commercial Attache, London. Ramie, undressed, common reeds, bagasse, rags, and other textile waste may be imported under an open general license which has been issued by the Board of Trade, so that until further notice importers can continue to import these goods without obtaining individual licenses. It is to be noted, however, that the importation of cotton and woolen rags is prohibited except under license by the import of goods and importers of these special waste products must continue to apply for import licenses to the Import Licensing Department.

They Started Something!

UP TO 1793, when Eli Whitney invented the cotton gin, the cotton industry had always been hampered by the costly, time-consuming hand method of separating the seeds from the fibres.

Whitney's gin did the job in a fraction of the time required by hand—and at a fraction of the cost! The effect was tremendous. Cotton became one of the world's greatest industries. People in every walk of life were literally reclothed. It was the beginning of the high speed, large scale methods that distinguish production of cotton fabrics today. Seldom has a single invention had such a profound and far-reaching effect upon history. Eli Whitney *started something.*

The first cylinder of Liquid Chlorine made by EBG in 1909.

EBG engineers started something, too, when they built the first equipment in the U. S. A. for producing Liquid Chlorine. They made this valuable product available commercially in this country for the first time in 1909. They made it possible for people everywhere to be sure of pure water supplies . . . to protect themselves from diseases that lie in sewage. They doubled and tripled the efficiency of bleaching textiles, paper and other products. They started an industry that is both vital and far-reaching in its effects. EBG has the advantage of pioneer experience in producing and servicing Liquid Chlorine. That advantage will work to *your* advantage if you use EBG Liquid Chlorine.

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

A Method for Estimating the Internal Surface of Cellulose By Means of Thallous Ethylate*

By Chapin A. Harris[1] and C. B. Purves[2]

Abstract

Thallous ethylate, in dilute ethereal or benzene solution, and dry, mercerized ramie gave a thallium cellulose in which the metal substituted hydroxyl hydrogen. More thallium was occluded in varying amount and in an undetermined state.

Evidence was presented to show that the reagent failed to penetrate into the interior of the cellulose micelles. Its action was thus restricted to the more amorphous regions or to the effective internal surface of the fiber.

The above thallium cellulose when methylated gave a product with a methoxyl content of 1.45 ± 0.3 per cent. One hydroxyl in every forty had thus been substituted by thallium and the effective internal surface of the mercerized ramie was accordingly about 4 x 10^5 sq. cm. per gram.

Semiquantitative data suggested that each hydroxyl on the internal surface was capable of attaching one molecule of water or of diethyl ether. The formation of the resulting, fairly stable unimolecular adsorption films was thus explained.

Preliminary results with the purified but unmercerized ramie and with a drastically mercerized specimen gave 0.24 and 18.4 per cent as superficial hydroxyl and corresponding internal areas of 3.7 x 10^4 and 2.9 x 10^6 sq. cm. per g., respectively. These data were not comparable because the first sample contained more beta and gamma cellulose. A cotton regenerated from cuprammonium had an area of about 4 x 10^5 sq. cm. per gram.

The new estimation of the internal surface of cellulosic materials was not unduly long or difficult. It gave reasonable results reproducible to ± 20 per cent and was sensitive to the pretreatment of the sample.

Although the details of the submicroscopic structure are still subjects for discussion *(1, 2, 3, 4)*, fibrous cellulose is generally considered to contain elongated micelles or crystallites in which the individual long chain macromolecules are arranged to form a regular xray lattice in space. These compact units grade into, or are bounded by, localities in which the arrangement is much more random and through which there runs a meshwork of fine capillaries varying downwards in cross section to molecular dimensions. The existence of these more random, spongy regions gives cellulose many of its colloidal properties, among which is a very large internal surface. The latter may be defined for present purposes as the fraction of the cellulosic hydroxyls wetted by a liquid soaking freely through the more random localities but failing to penetrate into the interior of the crystallites. By assuming an average area for these hydroxyl groups, or for the corresponding glucose residues, or for the molecule of an adsorbed material, the internal surface may be expressed as square centimeters per gram of cellulose. The value determined may be expected to depend upon the nature and the pretreatment of the fiber, and also upon the method of measurement. Thus, if a large molecule is employed as the "wetting agent," it may fail to record all of the random area because it fails to pass through the finer capillaries. The chemical nature of such an agent, of course, is an additional effect which cannot be ignored.

In some methods for determining this internal area, the cellulosic hydroxyls are progressively substituted chemically, a more rapid initial reaction is attributed solely to the surface hydroxyls, and the percentage amount of these is calculated from the degree of substitution. The heterogeneous esterifications *(4)*, the composition of cellulose xanthate and of the complexes with perchloric acid, nitric acid, sodium hydroxide, cuprammonium, etc. *(5)* have been interpreted in this way. The latter methods involve the admittedly doubtful assumption that only one hydroxyl in each superficial glucose residue reacts. In all of them the reagent either does, or possibly may, penetrate into the interior of the micelles. The xray and the reaction rate data of the esterifications are admittedly not precise enough to justify a sharp distinction between the superficial and intermicellar reactions. All these methods agree in assigning one-third to one-half of the cellulose hydroxyls to the

* Presented at the meeting of the New England Section of the Technical Association of the Pulp and Paper Industry, Cambridge, Mass., May 19, 1939. A portion of the thesis submitted by Dr. Harris in partial fulfillment of the requirements of the Massachusetts Institute of Technology for the degree of Doctor of Philosophy.

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surface, which accordingly has an area of the order 10^6 sq. cm. per g. for various fibers. This is perhaps too large, not only for the reasons mentioned but also because swelling or even solution of the cellulose increases the area during the measurement.

Another group of methods involves the decision as to when an absorbed material is present in a unimolecular layer, from the weight of which the surface may be calculated. This decision can be made by plotting the amount absorbed against some other measurable property, such as the relative humidity *(6)*, the selective absorption of water from various solutions *(7)*, the heat of swelling data *(8)*, the vapor pressure, dielectric constant and specific heat *(9)*. Inflections in the plots then reveal the transitions between liquid occluded in the capillaries and that adsorbed in a unimolecular film. The gradual nature of these transitions probably tends to make the observed results of the order of 10^6 sq. cm. per g. of fiber too high. Sharper inflections occur when moisture content is plotted against the electrical resistance *(10)* or adsorbed cobaltous chloride against the optical absorption density *(11)*. These results give a surface area *(12)* which is definitely lower and of the order 10^5 sq. cm. per gram. All these physical methods resemble the more chemical ones in that the area studied is probably somewhat enlarged by swelling during the measurement.

A consideration of the sources of doubt in the available methods suggested a study of the internal area with a reagent which would not appreciably swell the cellulose and whose chemical reaction would be confined to the surface hydroxyls. This was found in thallous ethylate, dissolved in ether or benzene. When fibers were soaked in excess of the reagent, which is a strong base, an insoluble yellow thallium cellulose was formed (ROH is a cellulose hydroxyl).

$$TlOC_2H_5 + ROH \longrightarrow ROTl + C_2H_5OH$$

A methylation with methyl iodide (or dimethyl sulphate) then produced a partly methylated cellulose,

$$ROTl + CH_3I \longrightarrow ROCH_3 + TlI,$$

the methoxyl content of which was a measure of the degree of thallium substitution and of the surface area. Thallous ethylate which was merely adsorbed or occluded would give rise to methyl ethyl ether during the methylation and thus not interfere with the result. These reactions proceed quantitatively or nearly so in the case of some fructosides in absolute alcoholic solution *(13)* and have been successfully employed in the methylation of other carbohydrates *(14, 15)*.

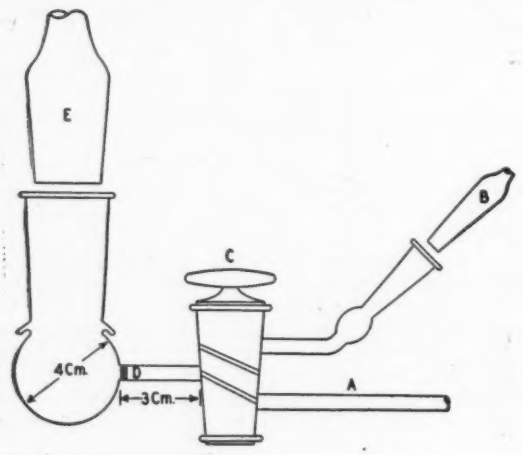


FIG. 1.

Experimental

MATERIALS.

(a) The crude ramie fiber kindly presented to us by Professor C. S. Griswold of Belmont, Mass., was manually freed from dark colored bark and other gross contamination. An extraction with boiling 1 per cent Ivory soap for 45 min. in the absence of air was followed by two similar ones with 1 per cent trisodium phosphate *(16)*. After the next treatment (cold 1 per cent acetic acid) and thorough washing with hot water, the product was air dried. A final extraction with hot ether in a Soxhlet was given and any colored fibers mechanically removed. Found *(17)*: moisture, 4.99; 4.97: ash, 0.081; 0.072: ash alkalinity, 0.72; 0.72: copper number (Schwalbe Braidy) 0.605: lignin (Schwalbe), 0.33; α-cellulose, 91.4; 91.4: β-cellulose, 0.61 per cent.

(b) Some of the above purified ramie was mercerized with 17.5 per cent caustic soda at 20 deg. C. for 45 min. *(18)* and after working up was dried with alcohol and benzene.

(c) More of the ramie was mercerized as in (b) but through mischance before washing the sample was wet with some alkali for about an hour. It was bried by alcohol and benzene, and finally over phosphorous pentoxide in a vacuum at 100 deg. C. The product had 0.05 per cent ash. Specimens (a), (b) and (c) were preserved over phosphorous pentoxide in an evacuated desiccator.

(d) The thiophene-free benzene and the ether were distilled from sodium just before use. Methyl iodide was shaken for a few seconds with dry silver oxide, filtered and distilled from phosphorous pentoxide. The dimethyl sulphate was distilled under reduced pressure.

(e) Thallous ethylate was very conveniently made by shaking 1 g. of finely sliced thallium with 50 cc. of absolute ethyl alcohol and oxygen in a glass stoppered 125-cc. flask for 4 or 5 hr. *(19)*. A trace of iodine was sometimes used to hasten reaction. After the thallium had dissolved, the alcohol was completely evaporated at room temperature in a desiccator kept evacuated, finally with an oil pump. The residual dark heavy oil was taken up in pure dry ether or benzene, diluted to 100 cc. in a glass stoppered graduate and allowed to stand till brown insoluble impurities had settled out. When kept at 5-10 deg. C. in the dark, the sparkling, colorless supernatant liquid retained its original normality for at least two weeks but in light or air the normality steadily diminished and a curdy brown precipitate appeared in a few hours. The ethereal or benzene solution was standardized against sulphuric acid or hydrochloric acid in aqueous alcoholic solution.

SUPERFICIAL METHYLATION AND DETERMINATION OF METHOXYL.

The cellulose specimen, usually bone dry and 0.1 to 0.3 g. in weight, was placed in the specially fitted 25-cc. Pyrex flask, Fig. 1, and after thorough exacuation through the side tube A, 20 cc. of 0.05 to 0.12 normal ethereal thallous ethylate was sucked in from the covered 60-cc. graduated reservoir B, by turning the three way tap C. There was a fused-in, sintered glass filter at D. The flask was covered with a dark

cloth and gently shaken for an hour, after which the solution was sucked out through exit A. Another 20 cc. of the thallous ethylate solution was allowed to react in the same manner. The reservoir B was then filled with dry benzene with which the sample was repeatedly washed. Methyl iodide, 1 cc., dissolved in ether or benzene, was then introduced, the vacuum was released and the ground-in glass stopper E replaced by a ground-in reflux condenser with a soda-lime tube at the upper end. Protection from light was unnecessary. After three hours or more of heating, when the very pale yellow thallium cellulose had turned to the bright yellow or orange color of thallous iodide, the condenser was replaced by the stopper and the product thoroughly washed with benzene. The final drying was at 50-80 deg. C. for an hour or more in high vacuum. Dimethyl sulphate (1 cc.) could be substituted for the methyl iodide with identical results. In this case the product was white in color, and the methylation took somewhat longer.

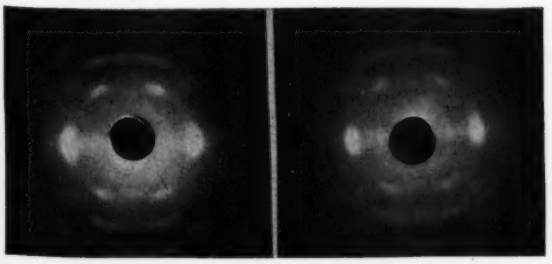
Methoxyl was determined essentially as described by Clark *(20)*. The mixture of phenol and hydriodic acid was boiled gently for thirty minutes before use, and the methoxyl column was altered slightly to fit the above flask with the superficially methylated specimen. In order to dissolve rather than resinify the sample, the temperature was kept for fifteen to twenty minutes at 70-80 deg. C., with occasional shaking before being brought to a boil.

Determination of Thallium in Thallium Cellulose.

Single samples could be prepared in the above equipment, Fig. 1, or as many as eight simultaneously in simpler apparatus, Fig. 2, which was the form finally adopted for most purposes. Thallium cellulose was not appreciably altered by transient exposure to the air. To estimate the metal, it was dissolved from the sample by 5 per cent acetic acid and the residue was thoroughly washed with the same solvent. Thallium was precipitated from the combined liquors as thallous chromate, dried and weighed as such, *(21)*.

X-Ray Analysis of Thallium Cellulose.

A small bundle of ramie fibers was mercerized *(18)* under slight tension on a glass frame to keep them in alignment. The film in the flat film camera was 36 mm. from the sample. A copper anode tube was used, filtered so that the Cu-Ka wave length (1.54Å) was the strongest produced. The exposure was five hours and the ordinary mercerized ramie pattern was obtained, Fig. 3A. The same fibers on the glass frame were then treated with ethereal thallous ethylate for two hours, washed with



A B

Fig. 3.

A. Mercerized Cellulose B. Thallium Cellulose

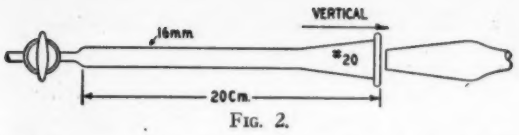


Fig. 2.

benzene and dried in the ordinary way. An xray pattern (Fig. 3B) was obtained as before save that an aluminum sheet 0.001 inch thick was placed over the film to cut down fluorescent radiation from the thallium.

Results and Discussion

Inability of Thallous Ethylate to Penetrate the Crystallites

An attempt to estimate the surface of a single crystal of sucrose weighing 0.1 g. by the above method gave a zero result. The reagents thus failed to permeate the sucrose crystal lattice. When the surface of the same weight of sugar was enormously increased by fine grinding, there was the usual color change from pale yellow to orange during the methylation, and the final methoxyl content was 0.11 per cent, indicating a minute superficial reaction. The unmercerized ramie fiber had an original methoxyl content of 0.04 per cent, increased to 0.18, 0.25 and 0.11 per cent in three separate estimations of surface. Any penetration into the interior of the crystallites could not possibly have exceeded these figures. Considerable amounts of thallium were absorbed by mercerized ramie and a partly methylated product was eventually obtained. If the heavy thallium atom had replaced hydroxyl hydrogen in the highly oriented region to even a slight extent, the xray fiber pattern of mercerized ramie would have been markedly changed. Comparison of Fig. 3A with Fig. 3B shows that no such noticeable change occurred. The thallium lines, Fig. 3B just outside the main ramie spots, were almost uniform circles indicating only a slight trace of orientation which perhaps corresponded to the much higher orientation of the silver amalgam which Frey-Wyssling *(1)* precipitated in the capillaries of cellulose. There was thus strong evidence of three different kinds to show that the action of ethereal thallous ethylate was restricted to the more amorphous regions of a cellulose fiber.

Thallium Content of Thallium Cellulose.

The absorption of thallium from thallous ethylate by samples taken at different times from the same batch of ramie mercerized in (b) (experimental section) varied widely in a way which could not be connected with differences in experimental pro-

TABLE I.—ADSORPTION OF THALLIUM BY MERCERIZED RAMIE (b)

Expt.	Thallous ethylate: Normality	Thallous ethylate: Solvent	Reaction time in hours	Thallium (24) Per cent	
1	0.086	Benzene	23	19.1	(a)
2	0.086	Benzene	23	20.3	
3	0.050	Ether	19	25.3	(a)
4	0.050	Ether	19	23.3	
5	0.120	Ether	48	10.0	
6	0.120	Ether	23	11.9	
7	0.053	Ether	28	14.1	
8	0.053	Benzene	5	16.8	
9	0.072	Benzene	26	25.4	
10	0.080	Benzene	44	25.6	
11	0.068	Benzene	4.5	12.8	
12	0.040	Benzene	18	15.4	
13	0.060	Benzene	19	2.1	(b)
14	0.060	Ether	4	13.1	(b)
15	0.052	Ether	17.5	20.5	(c)
16	0.052	Ether	3.5	14.6	(d)
17	0.052	Ether	16.5	23.1	(e)

(a) Pairs of samples treated together in the simpler equipment (Fig. 2).

Samples (b), (c), (d), (e) had 1.19, 1.93, 2.49 and 2.79 per cent of moisture, respectively.

cedure. This was invariably at room temperature, Table I, (see note).

It was clear from experiments 1, 2 and 3, 4 that this variation was not inherent in the samples. Neither was it due to a precipitation of thallous hydroxide by residual moisture in the fiber because added moisture (experiments 14-17) produced no very definite result if the thallous ethylate was dissolved in ether. Adsorbed thallium ethylate was practically absent, since the methoxyl content (see note) was only 0.24, 0.28, 0.24, 0.29 and 0.26 per cent in a series of thallium cellulose samples. The tentative conclusion was that the ethylate had been catalytically decomposed with the deposition of varying quantities of the metal in the fiber. The absorption of thallium by ramie was in consequence no reliable measure of the internal surface.

Methylation of Thallium Cellulose.

A series of thallium celluloses were therefore prepared in various ways (like those in Table I) and methylated with methyl iodide in benzene as shown in Table II.

TABLE II.—METHYLATION OF THALLIUM CELLULOSE FROM MERCERIZED RAMIE (b)

Expt.	Temp. 0 deg. C.	Time in hr.	OCH_3 per cent	Notes
1	80	3	1.61	Thallium derivatives prepared with no. 1 and 2, Table I.
2	80	3	1.53	
3	80	5.5	1.60	Tl derivatives prepared with no. 3 and 4, Table I.
4	80	6.5	2.01	
			1.91	Products divided for OCH_3 estimation.
			1.78	
5	80	3	1.53	
6	80	5	2.09	
7	80	7	1.49	
8	100	11	1.66(a)	Tl derivative divided before methylation.
	60	41	1.53	
9	100	11	1.44(a)	Tl derivative divided before methylation.
	60	41	2.11	
10	80	3	1.53	Original cellulose had 1.48 per cent moisture.
11	25	23	1.71	Methylated with Me_2SO_4.
		Average	1.70 ± 0.3 per cent.	

(a) Sealed tubes were used.

No variation in the technique produced a substantial effect in the degree of methylation. Consideration of experiments 1 and 2, 3, 4, 8, 9 suggested that the deviations from the mean value of 1.7 per cent methoxyl were largely due to deficiencies in the analytical method. Assuming that this average should be corrected for the thallium cellulose methoxyl content of 0.25 per cent, the superficial methylation amounted to 1.45 per cent methoxyl.

Although quite stable to benzene, about half of this methoxyl content was invariably lost by aqueous extraction. This was possibly because the superficial, partly methylated layers resembled some other partly methylated celluloses in being soluble in water.

Adsorption of Ether by Mercerized Ramie.

In order to prove that the presence of thallium cellulose was necessary for methylation, control experiments were made in which the dry, mercerized ramie (b) was heated with methyl iodide in ether. The products were quite free of iodine but had a substantial methoxyl content. This was completely accounted for by a strong and unsuspected *(22, 23)* adsorption of ether which was not completely removed by prolonged drying in high vacuum, Table III. Displacement of the ether with cold benzene was fortunately rapid and almost complete, the methoxyl content being reduced to 0.3 per cent in every case. Identical data were obtained with the thallium cellulose while a final ether wash left thirteen superficially methylated products with an average methoxyl percentage of 3.38. The difference between this and the average of 1.7 per cent obtained after benzene extractions (Table II) probably represented adsorbed ether.

TABLE III.—ADSORPTION OF ETHER BY MERCERIZED RAMIE (b)

Expt.	Drying hr.	Deg. C.	Methoxyl (see note)	Notes
1	2.5	70	1.46	
2	3.5	75	1.79	Methyl iodide present.
3	5	70	1.29	
4	4.5	70	1.86	
5	3.5	75	1.65	Ether alone.
6	19	98	1.25	
		Average	1.55 per cent	

Mathematical.

A methoxyl content of 1.45 per cent (see note) corresponded to the methylation of 2.5 per cent of all the hydroxyl groups in cellulose. This was therefore taken as the fraction present on the internal surface of mercerized ramie (b). By using Avogadro's number (6.06×10^{23}), the molecular weight of a cellulose anhydro glucose unit (162) and the area allotted to the same by xray data (about 42 sq. Å), the area occupied by 1 g. of cellulose crystallite spread out one glucose unit thick was calculated to be about 1.55×10^{23} sq. Å or 1.55×10^{7} sq. centimeter. As only 2.5 per cent of this theoretical maximum was capable of methylation by the thallous ethylate method, the available internal surface was 3.9×10^{5} sq. cm. per g., which was probably correct to ± 20 per cent. This result was of the same order of magnitude as those found for unmercerized cellulose by the cobalt chloride absorption method *(11)* or calculated from the electrical resistance data *(12)* (1.36 and 4.7×10^{5} sq. cm. per g. respectively). It is less compatible with the higher areas given by the other methods mentioned in the introduction.

The substitution of 2.5 per cent of the hydroxyls in the mercerized ramie by thallium involved a calculated metallic content of 9.6 per cent while the observed figures ranged from 10 to 25.6 per cent. (Table I, with the exception of experiment 13). The surplus over theory was attributed to the occlusion of thallium in unknown forms and variable amount within the fiber. As already mentioned, the ethylate is readily decomposed by light and perhaps by other catalytic agents.

It was interesting to note that a benzene solution of the ethylate had very little action on mercerized ramie with a moisture content of 1.2 per cent (Table I, experiment 13) perhaps because the water-immiscible hydrocarbon failed to remove the adsorbed water film. No such inhibition was noticed when the solvent was ether, in which water is somewhat soluble (experiments 14-17). This film was probably essentially one in which each superficial cellulosic hydroxyl had attached one water molecule *(6)*, as the value calculated for this was 0.83 per cent against the observed moisture content of 1.2 per cent. The adsorption of ether molecules by the same mechanism meant a firmly bound ether content of 3.43 per cent (or of 2.87 per cent as methoxyl) while the observed values (Table III) were 1.86 to 1.25 per cent after various periods of heating in high vacuum. The adsorption of diethyl ether by superficially methylated ramie also roughly corresponded to one ether molecule for one to two methyl ether groups. If, as suggested, each superficial cellulosic hydroxyl strongly attracted one mole-

cule of water or ether, in all probability it would hold one molecule of a lower alcohol to give the stable adsorption complexes which have been observed *(9)*. Higher alcohols would be adsorbed to a smaller extent because their larger molecular volume would prevent their penetration to all of the internal surface.

PRELIMINARY DATA WITH OTHER SAMPLES.

The purified but unmercerized ramie (a) had an original methoxyl content of 0.04 per cent increased to 0.18, 0.25 and 0.11 per cent in three estimations of surface. The average increase of 0.14 per cent corresponded to a surface hydroxyl value of 0.24 per cent and a superficial area of 3.7×10^4 sq. cm. per gram. The analytical method was here below its limit of accuracy and the order of magnitude alone was of significance. Farr particles *(3)* have a calculated area of 3.5×10^4 sq. cm. but the continuous micelle theory (a) is also compatible with the result. This work was not directly comparable with that on mercerized ramie (b) and (c) because mercerization removed 8.6 per cent of the fiber as beta and gamma cellulose.

A more drastically mercerized ramie (c) took up 46.6, 64.9 and 58.2 per cent of thallium in separate experiments and after the superficial methylation the methoxyl contents were 10.7 and 10.3 per cent. No less than 18.4 per cent of all the hydroxyls were on the surface in this case and the corresponding area was 2.85×10^6 sq. cm. per gram. A specimen of high grade cotton cellulose regenerated from cuprammonium, prepared by Dr. Grangaard, was methylated to the extent of 3.36 ± 1 per cent including adsorbed ether. Allowing 1.5 per cent for this, the superficial area was of the order 4×10^5 sq. cm. per g. or close to that of mercerized ramie (b).

These results were sufficient to show that the estimation was sensitive to the divergent internal areas of the various specimens.

Acknowledgement

The authors wish to record their thanks to Professor B. E. Warren for his valuable advice, and for the use of his equipment during the xray work.

Note: Percentages throughout this paper are based on the weight of the original cellulose sample. Diethyl ether and ethyl alcohol are expressed as methoxyl and the figures quoted must therefore be corrected by the factors 74/62 and 46/31, respectively.

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TAPPI Notes

The symposium on spectrophotometry in the pulp and paper industry, jointly sponsored by TAPPI and the Inter-Society Color Council and to be held on Wednesday afternoon, beginning at 2 o'clock, February 21, in the Hendrik Hudson room of the Roosevelt hotel, New York City, will include a dialogue between the two characters, Mr. Papermaker and Mr. Meter, which will be not only interesting and informational, but humorous as well. This novel dialogue will serve to introduce each speaker at the symposium and will provide the necessary continuity between the various subjects to be discussed. Situations and experiences with respect to the coloring of paper stock, occurring in the average paper mill, will play an important part in the dialogue. The role that the physicist may play in future color control and measurement in the pulp and paper industry is cleverly brought out in the character of Mr. Meter. The dialogue will introduce the following authoritative speakers on the symposium program: K. S. Gibson, National Bureau of Standards; J. A. Van den Akker, Institute of Paper Chemistry; R. S. Hatch, Weyerhaeuser Timber Company; R. N. Greisheimer, Mead Corporation; Myrl N. Davis, Kimberly-Clark Corporation; and William J. Foote, Consolidated Water Power and Paper Company.

Thomas L. Dunbar has been named president of the Capitol Wire Cloth and Manufacturing Company, Ltd., whose plant is located at Ottawa, Ont.

Pennsylvania State College men attending the annual meeting of TAPPI will hold a luncheon in the Florentine Room of the Lexington Hotel, New York, on Wednesday, February 21st, at 12:30 P.M.

The alumni of the New York State College of Forestry will hold a dinner at Sacher's Restaurant, 303 Madison Avenue, New York, N. Y., on February 21 at 6:00 P.M.

The alumni of the University of Maine will hold a luncheon at the Roosevelt Hotel at 12:30 P.M., February 20.

Any member who may desire to have an index to the Technical Section of the PAPER TRADE JOURNAL (Vol. 109, July to December 1939) may obtain it by writing to the Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York, N. Y.

The summer meeting of TAPPI will be held at the Olympic Hotel, Seattle, Wash., on August 20-23 inclusive. A special train of the Northern Pacific Railroad will leave Chicago on Friday evening, August 16, and arrive at Seattle on Monday evening, August 19. The train will stop over from 8:00 A.M. to 6:00 P.M. Sunday, August 18, at Livingston, Montana, and will be welcomed by a top flight TAPPI Rodeo which promises to be a wonderful show. A special exhibit is being arranged for the TAPPI annual meeting.

W. H. Chadfield Heads Scioto Paper Co.

COLUMBUS, Ohio, February 5, 1940—W. H. Chadfield, Cincinnati, was re-elected president of the Scioto Paper Company, at the annual meeting of the company. Other officers re-elected were: A. J. Ulrich, vice president, secretary and general manager; R. W. South and C. C. Hinterschied, agents. The company's offices are at 407-423 North Grant avenue.

The Drainage Resistance of Papermaking Pulps*

By W. O. Hisey[1] and C. H. Heigl[2]

Abstract

This paper presents an analysis of the flow of water through a forming mat of fibers, based on the Poiseuilles law. An equation was derived for the determination of the resistance to flow of water under conditions of constant rate of flow, and this equation was tested on pulp samples beaten to various degrees. It was found that the equation was valid for the conditions of testing, and that the test method described could be used to determine the specific resistance of pulp fibers to fluid flow, and that the method could also be used for the determination of compressibility of pulps. The test method described would appear to have very considerable value as a routine or research method of determination of pulp properties.

The rate at which water drains through a mat of fibers which are being deposited to form a sheet, from a uniform suspension, is an important fundamental problem in pulp and paper technology. In practically all of the operations of papermaking which have for their object the removal of water from a suspension of fibers, the water must flow through a mat of variable thickness and consequently against a variable resistance to flow. Although numerous empirical methods of determining relative differences in the flow resistance of fibrous materials in suspension have been developed and used, such as freeness testers of several types, no satisfactory quantitative study of the problem has been made. It is the purpose of this paper to present an analysis of the problem, based on Poiseuille's law, describe an apparatus for the determination of the specific resistance of forming fibrous mats to fluid flow in accordance with the requirements of the theoretical analysis, and to describe certain experimental work on one grade of pulp.

Theoretical Analysis of the Drainage Problem

The papermaking operations which involve the removal of water from a fibrous suspension may be considered to be filtration operations. Consequently it would appear that the problem of drainage resistance could well be attacked from the standpoint of filtration theory. Ruth and his co-workers have published *(2, 3)* an extended theoretical analysis of the filtration operation in which they have indicated that the fundamental law of filtration is Poiseuille's law, and that, in formulas derived from this law, the characteristics of the suspended solid which are of importance from the filtration standpoint may be expressed as "specific resistance" which is dependent on the properties of the solid. The formulas adduced by Ruth are unnecessarily involved for the purpose at hand, so an independent derivation was made from Poiseuille's law for this study.

Poiseuille's law is given as *(1)*,

$$P = \frac{32}{g}\,\frac{L\,u\,m}{D^2}$$

in which P is the pressure drop across a tube; L is the length of the tube; u is the velocity of flow in the tube; m is the viscosity of the fluid; D is the diameter of the tube; and g is the acceleration due to gravity. This law has been shown to hold under many conditions, so long as the flow rate, tube diameter, and viscosity of the fluid are so related that the flow is viscous in nature. Strictly speaking, the pores in a mat of pulp through which water is flowing should probably be considered as series of orifices rather than as tubes, but the results indicate that although the use of Poiseuille's law may be an approximation, it gives data which are very close to the experimental results.

Poiseuille's law holds, of course, only for a single tube, and since the diameter, length and number of tubes in a given area of pulp mat are unknown, it is necessary to re-state the law in such a manner that the variables are measurable quantities. Considering unit area of mat, an unknown number, N pores are available for flow. Assuming these pores to be circular, and V to be the rate of flow per unit mat area, it follows that:

$$\text{Velocity of flow in the tube} = u = \frac{4\,V}{N\,\pi\,D^2}$$

so that Poiseuille's law becomes

$$P = \frac{128}{\pi\,g} \times \frac{L\,V\,m}{N\,D^4} = K\,\frac{L\,V\,m}{N\,D^4}$$

It is reasonable to assume as a first approximation, that the length of the tubes L increases in proportion to the thickness of the sheet, which in turn depends on the weight of fibers deposited. Therefore, if the rate of flow of filtrate is constant, and the suspension is uniform, containing s grams of solids per unit volume of the medium, the length of the tubes at any given time after the start of the flow may be expressed as,

$$L = c\,V\,t\,s$$

in which c is a constant; V is the rate of flow per unit area of the mat; t is the time since the start of flow; and s is the weight of solids per unit volume of the suspension. Substituting this value for L gives:

$$P = \frac{K\,c\,V^2\,t\,s\,m}{N\,D^4}$$

Let $\dfrac{c}{N\,D^4} = R$, the coefficient of resistance,

and $\dfrac{R}{W} = R_s$, the specific resistance.

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* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Syracuse, Syracuse, N. Y., Sept. 12-14, 1939.

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[2] Member TAPPI, Scott Paper Company, Chester, Pa. Formerly Graduate Assistant, New York State College of Forestry.

But W, the weight of solids per unit area of sheet is defined as,

$$W = V t s$$

if the rate of flow is constant and the suspension is uniform.

Therefore,

$$P = K V W m R \quad (1)$$

or

$$P = K V W^3 m R_s \quad (2)$$

This final expression is Poiseuille's law in a form suitable for use in the determination of the specific resistance of a pulp which is being formed into a sheet under conditions of a constant rate of flow from a uniform suspension.

The specific resistance, as defined by the equation given, is dependent on the number of pores in a unit area of mat, and on the fourth power of the diameter of these pores. The fact that pore diameter enters to the fourth power indicates that a small change in this factor will result in a very marked change in the specific resistance so that a mat formed from fine fibrous material would have a greatly increased resistance to flow over a similar mat formed from a coarser fiber, due to the smaller average diameter of the pores.

Further, the specific resistance determined experimentally, with the aid of the equation given, should be a constant for a given pulp, dependent only on the characteristics of the fibers forming the sheet and independent of the conditions of testing, if the fibrous material making up the mat were incompressible. In fact, however, a fibrous mat is compressible and tends to be deformed under the stress represented by the pressure drop across the mat. This deformation under pressure stress results in a tendency to close the pores through which flow is taking place, thus decreasing the diameter of these pores and increasing the specific resistance. Consequently, on *a priori* grounds, one would expect that any change which would result in smaller pores such as increased pressure drop across the sheet, would increase the specific resistance.

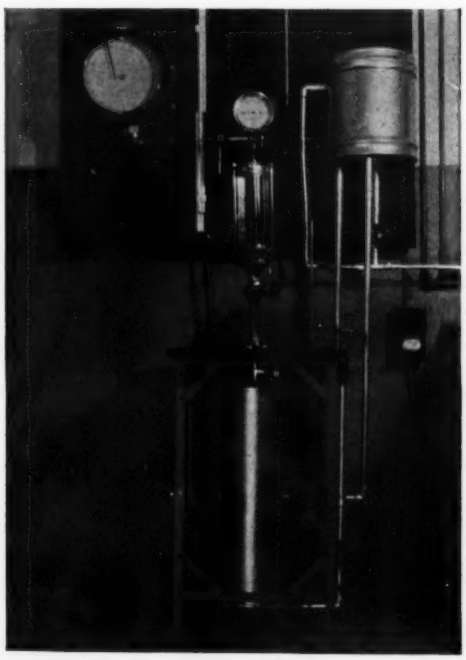

FIG. 1.

Apparatus Used in the Experimental Work. The Low Head Box Shown Was Replaced with a Higher One for the Experimental Work, as Mentioned in the Text.

Apparatus

Having completed the theoretical derivation of an equation suitable for the determination of the specific resistance of fibrous materials, the next step was to construct an apparatus for the experimental work. The fundamental requirements for such an apparatus are:

A constant rate of flow, regardless of the pressure drop across the sheet during formation.
Means for varying the rate of flow, by known amounts.
Means for recording the pressure drop across the sheet during formation.
Arrangement for the reuse of white water, in order to minimize the influence of loss of fines during the formation of the sheets.

Fig. 1 shows the apparatus set up and used for the work herein reported. A Williams freeness tester was rebuilt for forming the test sheets. The regular cylindrical headbox was removed and replaced with a taller one having a capacity of 2½ liters. Also, a special grid plate was constructed and covered with 40-mesh wire, faced with 150-mesh wire to minimize the loss of fines. Connection just below the grid plate was made to a vacuum recorder, which was used to record the pressure drop across the sheet during formation. This vacuum recorder was manufactured by the Taylor Instrument Cos. and had a range of 0 to 20 in. of mercury, the instrument being modified so that the chart made one revolution in 6 sec., thus providing a record of the pressure drop across the forming sheet and formation time, even though the time involved was only a few seconds.

The discharge of the freeness tester was connected with a water reservoir, constructed of 6-in. copper tubing, and this in turn was connected with a motor driven gear pump, of ½ in. size, and which produced flow through the apparatus. A v-belt drive was used on the pump so that by changing sheaves it was possible to obtain different pump speeds, and different rates of flow. Discharge from the pump was led to an overhead reservoir, from which it was returned to the system for making subsequent sheets.

The gear pump was capable of drawing a vacuum of 28 in. of mercury, in the system, and all parts of the apparatus were made tight enough so that this vacuum could be maintained over a period of several minutes, thus indicating the absence of leaks. Calibration tests on the gear pump indicated that it was capable of maintaining a rate of flow which was constant within 2 per cent in the range of 0 to 20 in. of mercury, after it had come up to speed. In the starting period, the discrepancy in rate of flow was greater than this, due to the lag of the motor and pump attaining full speed. However, all pressure drops, except in the preliminary tests, were obtained after conditions of constancy had been reached, so that the rates of flow were substantially constant.

The vacuum recorder was calibrated against a mercury manometer, under conditions of both rising and falling pressures. All results were corrected for the errors of the instrument.

As a preliminary to making a series of tests with the apparatus, 15 or 20 sheets were made to balance the fines in the return water system. It was estimated that this number of sheets would result in a balanced condition so that the fines lost from the pulp in the

sheets would be made up by the fines introduced in the white water.

Method of Operation

A few preliminary experiments were made with various weights of pulp, of the type to be used in the series of tests, to find the weight of sheet which would result in a maximum pressure drop within the capacity of the recorder under the conditions established for the series. Having determined this maximum, the samples for all sheets were weighed out in the form of moist pulp.

White water was introduced into the system in a volume slightly less than that established for the test, the pulp sample was disintegrated for a period of 1 min. with a small motor driven stirrer, and introduced into the head box of the apparatus. White water was then added to bring the volume to that established for the test and the sample agitated by stirring. In this work four standard volumes were used, namely 600, 1200, 1800, and 2400 cc. resulting in a change in consistency without changing other conditions of the test. A standard temperature of 25 deg. C. was used throughout.

Having a uniform suspension in the head box, the motor was started, the recorder being wired to start simultaneously. As the water was drawn from the suspension at a uniform rate, a sheet was formed on the wire, and the pressure drop across the forming sheet was recorded by the vacuum instrument. This vacuum built up to a maximum as the sheet formed, and a sharp break in the curve appeared as the air came through at the end, marking the end-point of the formation. From the vacuum recorder curve, both the time and the pressure drop across the sheet could be determined very accurately. All tests were run in triplicate, the records appearing on the same chart.

At the conclusion of the sheet formation, the sheet was couched from the wire with blotters, pressed lightly, and oven dried at 110 deg. F., the weight of moisture-free fiber being determined.

Having the weight of the sheet and the record of the pressure drop across the sheet, it was possible to calculate the specific resistance, either for the terminal conditions or for any point during the formation. Except in the case of the preliminary experiments, the terminal conditions were used for the calculation of specific resistance.

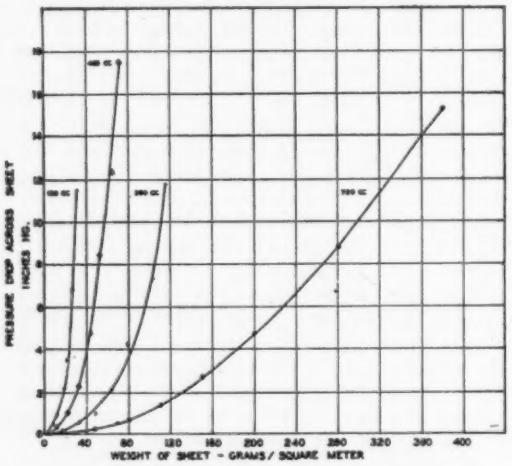

Fig. 2.

Pressure Drop across Sheet vs. Sheet Weight. A Sample Set of Experimental Results, Transferred from the Circular Chart Record of the Instrument to Rectilinear Coordinates. Corrected for Positive Head of Water above the Wire.

Experimental Work

Pulp Preparation

The pulp used throughout this study was Solka no. 1, soft alpha, made by the Brown Company, Berlin, N. H. Samples of various degrees of beating were prepared in a 1½-lb. beater, according to TAPPI Standard Method T 200m-34, using a weight of 5500 g. on the bedplate lever. Freeness tests, using the Canadian standard apparatus and method, were made at frequent intervals during the beating cycle, which was continued until a suitable freeness had been reached. The entire beater load was then dumped, drained, pressed to approximately 33 per cent solids, and stored in an air tight container with a small amount of formaldehyde as a preservative.

Four samples of pulp of different degrees of beating were prepared in this way and formed the raw material for the study. Freeness and drainage factors were determined on these pulp samples, with the results given below.

Sample no.	Freeness (Canadian standard)	Drainage factor (T 205 m-36)
I	720	0.65
II	590	1.77
III	465	7.17
IV	180	37.10

Preliminary Experiments

It was a matter of primary importance in this research to check the validity of the formula deduced from the theoretical analysis. In order to do this, a number of tests were made on the pulps described above, and the pressure records from the recording instrument charts were transferred to rectilinear coordinates, correcting for the positive head above the wire at the various stages of the formation. Fig. 2 includes a sample set of results thus obtained. In Fig. 2, the pressure drop across the sheet at various instants during the formation of the sheet is plotted against the weight of the sheet at that instant. The sheet weights at the various instants of time during the formation were calculated from the known rate of flow, the elapsed time from the start of the formation (determined from the instrument record), and the known concentration of solids in the headbox. It is to be noticed that the curves are smooth and form a family.

Inspection of equation 2 indicates that if it is valid, plotting of the pressure drop across the sheet against the square of the sheet weight should result in a straight line. The slope of this straight line would be the value of R_s, the specific resistance. The data of Fig. 2 has been replotted as Fig. 3. In this case the pressure drop across the sheet at various instants during the formation is plotted against the square of the sheet weight at that instant. It will be noticed that the result is a series of straight lines of varying slopes, the least slope being associated with the unbeaten pulp of 720 cc. freeness, and the greatest slope being associated with the pulp of the least freeness of 180 cc. freeness. Some deviations from straight lines are to be noted but these deviations may be attributed to the lag in the motor and pump in coming up to speed, and an increase in the specific

resistance brought about by the increasing pressure drop across the sheet concomitant with the increase in the sheet weight. However, the results do not vary to any great extent from straight lines, and may be taken to support the validity of the equation, at least to a first approximation.

Experimental Results

The preliminary experiments indicated the fundamental validity of the equation developed. The next step was to determine the effect of the several variables which enter the determination of the specific resistance, since *a priori* reasoning had indicated that secondary effects were to be expected, due to the compressible nature of the pulps. For this purpose, a total number of 400 experiments were made with the pulps already described, each test being made in triplicate. These experiments were arranged to determine the effect of the variables listed below:

Beating degree of the pulp. The four pulps described above were used, the four samples having freeness values (Canadian standard) of 720, 590, 465, and 180 cc., respectively.

Concentration of pulp in the headbox. This was varied by changing not only the weight of the pulp used for making the sheet, but also by changing the volume of suspension in the headbox.

Rate of flow. This was varied through values of 92.97, 74.28, 62.85, 51.14, and 37.93 liters per sq. m. per sec. by varying the speed at which the pump was operated.

Pressure drop across the sheet. This was the variable whose values were dependent on the variables listed above. Due to instrumental limitations, the pressure drop was held within the range of 2 to 20 in. of mercury, by choosing the amount of pulp used to make the sheet so that the resulting pressure drop would fall within these limits.

The specific resistance R_s was calculated from the experimental results by means of equation 2, in which,

P is the pressure drop across the sheet, at the maximum reached at the end-point of the sheet formation, evaluated in terms of kilograms per square meter.

K is $\frac{128}{\pi g} = 0.0415$, in metric units.

V is the rate of flow, in terms of liters per square meter of sheet surface per second.

W is sheet weight, in terms of grams per square meter, or is $V\ t\ s$, in which t is the time in seconds and s is the concentration of solids in grams per liter.

m is the viscosity of the water evaluated in centipoises or since a standard temperature of 25 deg. C. was used for all determinations, 0.89 cp.

R_s is the specific resistance, evaluated in metric units as indicated.

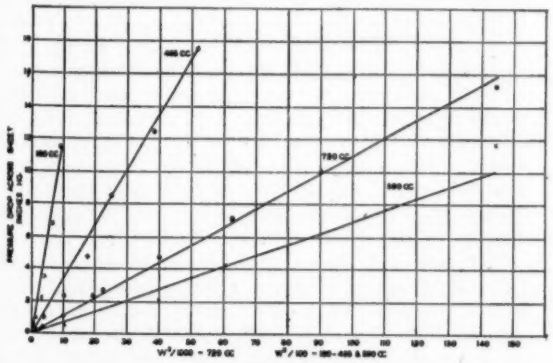

FIG. 3.
Pressure Drop across Sheet vs. Square of Sheet Weight.

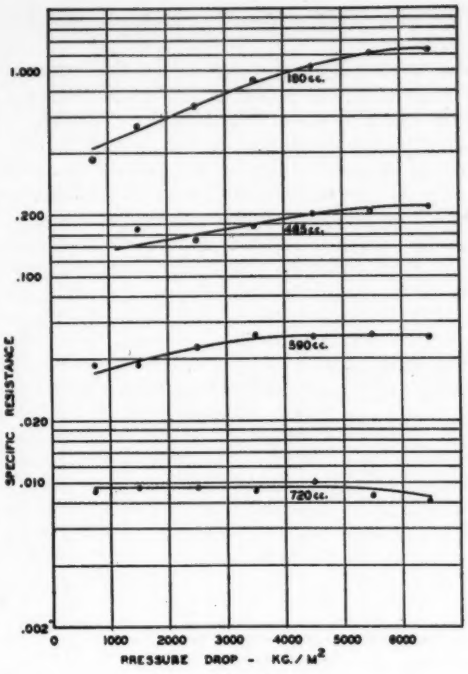

FIG. 4.
Effect of Pressure Drop on Specific Resistance.

The formula was solved for R_s for every experiment, thus giving a series of values for R_s on the basis of pure theory, with no account being taken of the secondary effects of the several variables entering the process of sheet formation. These values of R_s were then subjected to analysis to determine such secondary effects. The analysis was made by means of group averages and classification, with results which are presented in the following discussion.

Effect of Pressure Drop on Specific Resistance

In the theoretical discussion of the problem of drainage resistance it was pointed out that the fibers making up a mat were compressible, so that the mat would tend to be distorted under the influence of the pressure drop across the sheet during formation. The result of this deformation of the mat structure would be to close the pores and thus produce an increase in the specific resistance to flow of the fluid. The experimental data were analyzed to determine the importance of this factor, with the results shown in Fig. 4. The points on the curves of Fig. 4 are averages resulting from the classification of the data, and have been corrected for the influence of consistency and rate of flow.

Examination of the curves of Fig. 4 indicates that there is a distinct influence of pressure drop, as was anticipated. Further, it is shown that the magnitude of this effect is dependent on the degree of beating to which the pulp has been subjected, increasing with increasing beating. The unbeaten pulp (720 cc. freeness) proves to be substantially incompressible under the conditions of the experiment, at least in the range of 0 to 5000 kg. per sq. m. The moderately beaten pulp proves to be slightly compressible, as indicated by the increasing slopes of the curves for the progressively more beaten pulps. The most strongly beaten pulp (180 cc. freeness) shows a very decided in-

crease in specific resistance with increasing pressure drop.

The results obtained may be readily explained on the basis that one of the effects of the beating is to soften the fibers so that they are less rigid after beating than before. This softening is reflected in an increased compressibility of the pulp, and a resulting increase in specific resistance with increasing pressure drop across the fiber mat during formation.

These results indicate a possible method by which the compressibility of pulp fibers might be measured. If a series of determinations of specific resistance are made on a given pulp, under such conditions that the variables of rate of flow, concentration of solids in the headbox suspension, and viscosity of the suspending medium are held constant, and only the sheet weight and pressure drop allowed to vary, and if these specific resistances are plotted against the pressure drops, the slope of the line produced would be a measure of the compressibility of the pulp under investigation. Unquestionably, the compressibility of pulps will vary widely, and one would expect that the compressibility coefficient thus determined should bear a very close relation to the bulking properties and strength qualities of the pulp.

The Effect of Rate of Flow on Specific Resistance

From the same type of reasoning as that applied to the variable of pressure drop, it could be expected that an increase in the rate of flow would have secondary effects which would tend to increase the specific resistance. That this is the case is indicated by the results shown in Fig. 5, in which the curves of rate of flow against specific resistance are given. Here again, the results are corrected for the influence of pressure drop and consistency. It is to be noted that the influence of rate of flow appears to be more important in the case of the unbeaten pulp than in the case of the highly beaten pulp, which is opposite to the effect of the pressure drop. In an apparatus set up for the routine determination of specific resistance, the rate of flow would be kept constant, and variations in rate would not come into question. In order to obtain comparable results from several different sets of apparatus, however, all should be operated under substantially the same rates of flow.

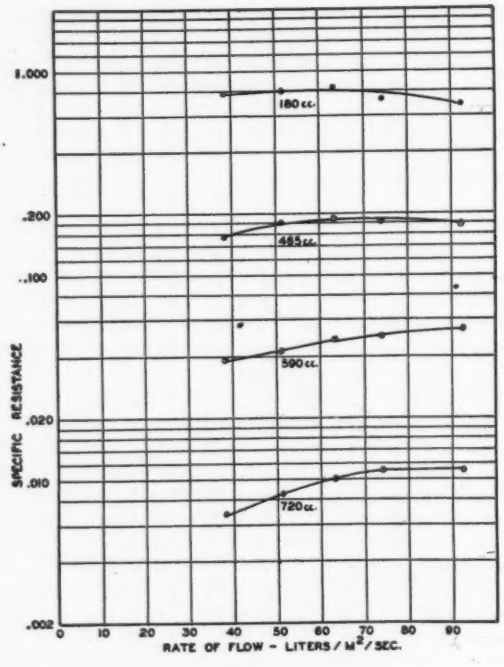

Fig. 5.
Effect of Rate of Flow on Specific Resistance.

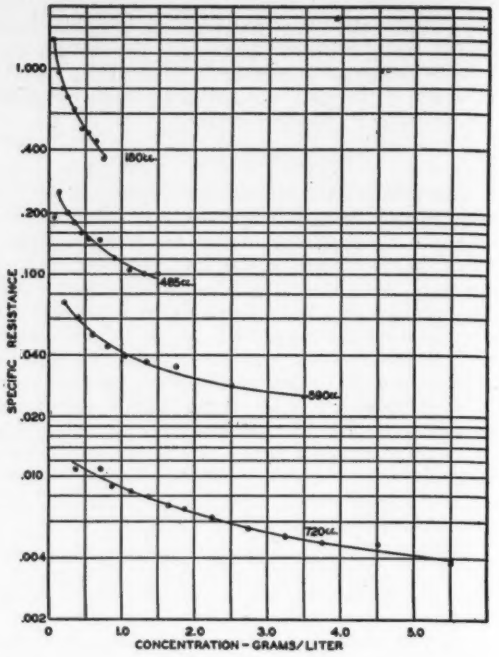

Fig. 6.
Effect of Fiber Concentration on Specific Resistance.

The Effect of Concentration of Fiber on the Specific Resistance

The concentration of fiber in the suspension from which the sheet is being formed has an important influence on the specific resistance. The experimental evidence on this point is shown on Fig. 6, in which the specific resistance has been plotted against the concentration of fiber, in grams per liter, for the four pulps which were used in this study. Increasing the concentration resulted in a decrease in the specific resistance for all cases studied. The reason for this tendency is readily understood when it is considered that increasing concentration of fibers is accompanied by a tendency toward flocculation which in turn results in a nonuniform suspension and a nonuniform formation of the mat. This implies the presence of some pores in the mat which are relatively large, and since the diameter of the pores enters as the fourth power, a few such large pores would produce a decrease in the specific resistance out of proportion to the number of such pores.

The effect of flocculation, described above, is one of the defects of laboratory sheetmaking equipment which operates under natural drainage conditions. Flocculation is a time effect, consequently pulps, with a high resistance, which take an appreciable time to drain, are formed into test sheets under quite different conditions than pulps with a low drainage

resistance which take a short time to drain. The sheets which are formed slowly are formed from a nonuniform suspension, since the time of drainage has given ample opportunity for flocculation to take place. Consequently such sheets are less perfectly formed and have physical properties which vary from those which would have been obtained if the drainage time were a constant.

A question which arises in connection with the effect of changes in concentration is whether or not this effect is independent of the pulp properties. In order to determine this point the data of Fig. 6 was replotted as Fig. 7, on a log-log plot. Examination of Fig. 7 indicates that the curves are straight lines, and that they are substantially parallel. This indicates that the effect of concentration is independent of the pulp properties, at least for the pulps studied in this investigation, and that the effect of the concentration of fibers will enter the equation as a power function. Rearranging the original formula to make it explicit in R_s, and applying the concentration correction, gives:

$$R_s = \frac{P}{K\,V\,W^2\,m}\,s^{-x} \qquad (3)$$

in which s is the concentration of fiber in grams per liter and x is exponent describing the slope of the lines in Fig. 7. Evaluation of x from the data on which Fig. 7 was based resulted in an average value of $x = -0.45$. It is, of course, impossible to say that this value for x would hold for fibrous materials with characteristics differing widely from that used in this study. The characteristic values of x for groundwood pulp, hardwood soda pulp, etc., would have to be determined experimentally from further research.

The fact that the effect of the concentration of fiber in the suspension may be evaluated by the equation, as indicated, leads to two results of practical value. In the first place the tests for specific resistance may be run at any convenient concentration, the results corrected for the effect of concentration, and reported on the basis of a standard concentration. In the second place, pulps are of necessity handled in the laboratory at much lower concentrations than obtain in mill practice, so that laboratory results are generally not directly applicable to mill operations. Insofar as specific resistance determinations are concerned, the results may readily be evaluated for concentrations which obtain in mill practice.

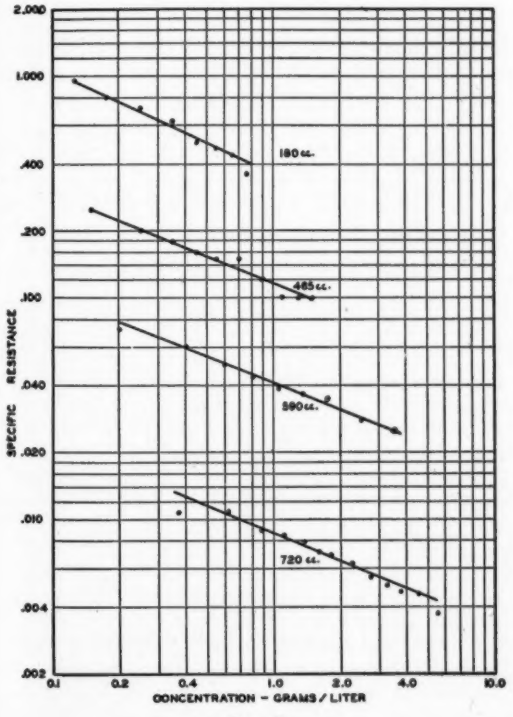

FIG. 7.
Log-Log Plot of Fiber Concentration against Specific Resistance.

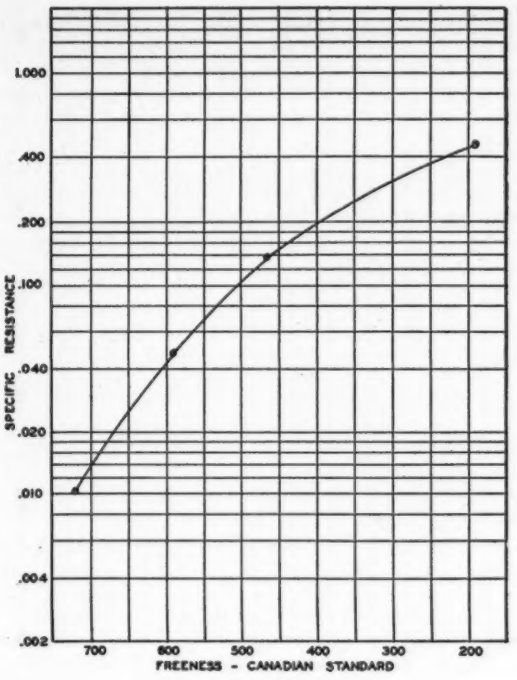

FIG. 8.
Relation between Freeness and Specific Resistance.

FREENESS, DRAINAGE FACTOR AND SPECIFIC RESISTANCE

The freeness test, in its numerous modifications, has been used as a measure of the drainage resistance and beating degree of pulps. Fig. 8 shows the correlation existing between the freeness (Canadian standard) of the pulps used in this research, and the drainage resistance of the same pulps. It will be noticed that the drainage resistance of the pulp increased by 45 times on beating from a freeness of 720 cc. to a freeness of 180 cc. Thus the numerical range of the drainage resistance figures is very large in comparison with the change in freeness. In addition, the drainage resistance and the freeness do not vary linearly, so that a given drop in freeness, in cubic centimeters, is not associated with a constant change in drainage resistance. It is well known that the freeness tester is much less accurate in the range of low freeness than in the high range, and that there is a maximum drainage resistance (minimum freeness) beyond which the results from the freeness tester are meaningless. It is probable that many of the cases in which the drainage rate on the

paper machine does not follow the indications of freeness tests are due to this difficulty inherent in the freeness test. This is particularly true in the case of groundwood pulps since many groundwood mills are making pulp of a freeness which approaches the limit at which the freeness tester may be used.

The drainage factor described in TAPPI standard method T 205 m-36 has been recognized to eliminate many of the disadvantages of the freeness test and to be especially applicable for high accuracy work on slow pulps. In Fig. 9 the specific resistance values of the four pulp samples used in this research have been plotted against the drainage factors. It is to be noticed that, in the case of the slower pulps, the relationship between the two measurements is marked. In fact, in Fig. 9, which is drawn on a log-log cordinates, the slope of the line for the pulps of 590 freeness and below is nearly unity, indicating that in the case of these beaten pulps the two testing methods are measuring substantially the same pulp characteristic. In the case of the unbeaten pulp, however, the direct relationship breaks down, due possibly to the effect of the high consistency necessary to obtain the drainage factor figure on this very free pulp. No evidence is available as to the relationship in the very low range of freeness pulps, but one would expect the linear relationship to hold within reasonable limits.

Conclusions

The specific resistance of pulp to drainage, as determined by the use of the formula and apparatus described in this paper, has several interesting characteristics which indicate that it should have a wide degree of usefulness. These may be summarized as follows:

Specific resistance has a definite physical meaning, since an increase in the specific resistance is related to either a decrease in the average diameter of the pores in the sheet through which water is passing, or an increase in the number of such pores, or both. In this respect it differs from freeness and many other measures of pulp properties at present in use which have only an empirical validity, and which are difficult to interpret in practice.

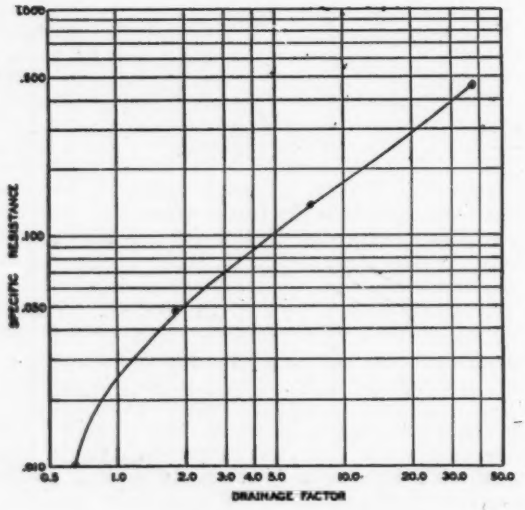

FIG. 9.
Relation between Drainage Factor and Specific Resistance.

The test method described appears useful over a wide range of pulp properties, apparently with as great validity and accuracy in one range as another.

The influence of the concentration on the test results may be evaluated and eliminated from the final results, so that regardless of the concentration actually used in making the determination, results may be expressed on a standard basis, or may be adjusted to enable test results to be used in practical application.

The method of test allows the determination of the compressibility of the pulp to be made. This may be of considerable value in many problems, since the compressibility is undoubtedly directly connected with the bulking characteristics of certain pulps, and is indirectly connected with strength properties. Thus, the determination of specific resistance would appear to offer a means of attack on many mill problems which would be difficult of approach by other means.

The determination of specific resistance offers considerable promise as a routine control method as well as a research tool. The method should be rapid in operation, since no consistency test need be made previous to running the test, and the only factors to be determined are the weight of the final sheet, the maximum vacuum produced during the formation of the sheet, and the volume and temperature of stock in the headbox, assuming that the apparatus is arranged to have a fixed rate of flow. The sheets obtained from the apparatus are of a small size and should dry in a few minutes. Calculations may be made readily by means of a chart.

Further studies of specific resistance are in progress to determine its usefulness in the testing of pulps of a different nature than that used in this preliminary research. At the present time a study of the drainage resistance of groundwood pulp is under way, under the auspices of the Mechanical Pulping Committee of TAPPI. It appears probable that the determination of the specific resistance of groundwood pulps will eliminate some of the difficulties now met with in groundwood testing and control.

Literature Cited

(1) Badger, Walter L. and McCabe, Warren L.—"Elements of Chemical Engineering," Second Edition, p. 33, New York, McGraw-Hill (1936).
(2) Ruth, B. F., Montillon, G. H., and Montonna, R. E. "Studies in filtration", *Ind. Eng. Chem.* 25, 76-82, 153-161 (1933).
(3) Ruth, B. F. "Studies in filtration," *Ind. Eng. Chem.* 27, 708-723, 806-816 (1935).

Chlorine Institute Elects Officers

The Chlorine Institute, Inc., held its annual meeting and directors' meetings on January 24, 1940 at the Chemists' Club, New York, N. Y. The following directors were elected for two years: R. W. Hooker, Hooker Electrochemical Company; S. W. Jacobs, Niagara Alkali Company; E. C. Speiden, Isco Chem. Division of Innis, Speiden & Co.

The hold-over directors are: N. E. Bartlett, Pennsylvania Salt Manufacturing Company; Thomas Coyle, R. & H. Chem. Dept., E. I. du Pont de Nemours & Co., Inc.; John A. Kienle, The Mathieson Alkali Works, Inc.; Louis Neuberg, Westvaco Chlorine Products Corporation; Eli Winkler, Columbia Alkali Corporation.

At a directors' meeting following the annual meeting, the officers shown below were elected for the year 1940. S. W. Jacobs, president; E. C. Speiden, vice president; Robert T. Baldwin, secretary and treasurer.

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Machinery

Paper Refining Engine Plug. Homer D. Martindale, assignor to the Black-Clawson Company. U. S. pat. 2,146,830 (Feb. 14, 1939).—A jordan plug is constructed so that the knives are held very firmly seated in the slots in a simple manner by annular bands provided in surface indentations in the plug, the separators being held against radial outward movement as they are secured to the knives by cooperating longitudinal surface irregularities on the knives and spacers. The surface indentations provide substantially cylindrical surfaces on the plug body, terminating in abrupt shoulders against which the bands are held when the knives are moved into locking engagement with the bands.—A.P.-C.

Press Device for De-Watering Webs or Sheets of Paper, Cellulose, Ground Wood, Board and Similar Substances. Maschinenfabrik Buckau Wolf A. G., Magdeburg. Ger. pat. 655,781 (July 5, 1936).—The press rolls are provided with casings which are perforated with numerous small holes tc allow the liquids presed out to escape.—J.F.O.

Jordan. L. Lyche, Halden, Nor. pat. 57,818 (Oct. 1, 1935).—The jordan is provided with scoops at the large end of the plug which aid in removing the stock. —J.F.O.

Refiner. Raymond C. Benner and Albert L. Ball, assignors to the Carborundum Co. U. S. pat. 2,124,-393 (July 19, 1938).—A pulp refining engine comprises a metal shell, a lining for the shell consisting of bonded abrasive blocks, a substantially continuous layer of tough, resilient, vulcanized rubber between the blocks and the shell and serving to attach the blocks to the shell, and a plug of bonded abrasive material rotatably mounted within the shell.—A.P.-C.

Rewinder. Sterling W. Warner and Lynn B. Case, assignors to John Waldron Corporation. U. S. pat. 2,141,629 (Dec. 27, 1938).—The machine is provided with hydraulic means for supporting independently of the rollers substantially all but a predetermined amount of the total weight of the roll being wound and associated mechanism, so that the weight supported by the rollers will remain substantially constant irrespective of increase in the total weight of the rewound roll as it increases in size.—A.P.-C.

Winder With Double Carrying Roll for Winding Paper, Carton and Similar Materials. Jagenberg Werke A. G., Dusseldorf. Ger. pat. 655,850 (April 12, 1935).—Arrangement of tension roll to aid in winding hard rolls of paper.—J.F.O.

Unwinder and Winder Mechanism for Paper Machinery. Charles P. Putnam, assignor to Beloit Iron Works. U. S. pat. 2,141,315 (Dec. 27, 1939).—The invention provides winding mechanism for supercalenders operated directly against the rolls of the machine with which they are employed, the sheet being supported against the surface of a roll at all times, thereby entirely eliminating the conventional draw. The roll of paper is driven directly by contact against the roll of the supercalender. Improved means are provided to regulate the pressure between the rolls during the handling of a roll of paper.—A.P.-C.

Device for Fastening the Circular Knives on the Shaft for Paper, Textile, and Similar Webs. L. Sabler, Stuppach. Ger. pat. 655,065 (Mar. 27, 1935). —A flexible coupling ring is provided.—J.F.O.

Device for the Automatic Indicator or Automatically Hindering the Tearing of the Web of Paper. Siemens Schuckertwerke A. G., Berlin Ger. pat. 656,506 (Nov. 17, 1934).—A system of photoelectric cells placed at each edge and at the center of the web of paper which indicate and set in motion means to hinder the tearing of the sheet.—J.F.O.

Automatic Guide for the Conveyor Band for Cross and Diagonal Cutter for Paper Webs and Similar Material. C. Haubold A. G., Chemnitz, Ger. pat. 657,314 (Dec. 24, 1936).—J.F.O.

Circular Cutter. Goebel A. G., Darmstadt, Ger. pat. 658,276 (Jan. 29, 1936).—Method for the quick changing of knives for a circular cutter.—J.F.O.

Adjusting Device for Single Upper Knives on Rewinders and Slitters for Paper Machines and Similar Machines. E. Schurmann, Dusseldorf. Ger. pat. 657,852 (Oct. 26, 1934).—A method of setting the upper knives so that there is no injury to the knife edge.—J.F.O.

Centrifugal Screen for Pulp, Ground Wood and Similar Fiberous Materials. O. Quiller & S. Thune, Skoyen. Nor. pat. 58,698 (Jan. 18, 1929).—An overflow is arranged within the screen to remove the finely divided material.—J.F.O.

Vacuum Mechanism for Paper Machines. Arthur E. Broughton. U. S. pat. 2,147,877 (Feb. 21, 1939). —The invention provides a single suction pump for use in maintaining the proper vacuum on groups of suction heads for a number of paper machines, and provides also suitable mechanism which, as a break occurs on one or more of the machines, or as one or more of machines is shut down, will permit the pump to properly operate in conjunction with the remaining machines so that they may be maintained in operation. —A.P.-C.

Movable Fourdrinier Suction Box Assembly. Bernard A. Malkin, assignor to Dominion Engineering Works Ltd. U. S. pat. 2,145,226 (Jan. 24, 1939). —Each suction box is suspended from the suction box rails by two horizontally swinging links which serve to impart opposite lateral or oscillating motion to the ends of the box as it is moved across the wire. —A.P.-C.

Cell Suction Roll for Paper Machines. Maschinenfabrik Banning & Seybold A. G. Duren. Ger. pat. 656,453 (Aug. 11, 1936).—The new suction roll improves on the present by operating without great rubbing and packing failures and still easy to get at. —J.F.O.

Suction Roll for Paper Machines. Firma Feirabend, Niedernhausen, Ger. pat. 658,514 (April 11, 1937).—A new simple and cheap arrangement of suction roll construction.—J.F.O.

Process and Arrangement for the Manufacture of Endless Wires and Wires With Seams. H. Kurtz, Reutlingen. Ger. pat. 657,143 (March 5, 1936).—Special weave of the wire.—J.F.O.

Fourdrinier Wire. Willie D. T. Green, assignor

to the United Wire Works, Ltd. U. S. pat. 2,143,552 (Jan. 10, 1939).—A twill weave or multiple weave fourdrinier wire cloth in which the crests of the long crimps of the weft are in a plane which lies at a distance less than half the diameter of the warp wire below the plane of the crests of the warp knuckles, is subjected to a surface grinding operation restricted to grinding down only the outer or raised warp knuckles until the flat surfaces thus formed are level with the crests of the long weft crimps.—A.P.-C.

Wire Fabric Seam and Method of Producing the Same. William E. Buchanan, assignor to Appleton Wire Works, Inc. U. S. pat. 2,141,706 (Dec. 27, 1938).—The ends of the warp wires of each of the cloth to be joined are cut along a line parallel to the weft wires and at a distance from the last weft wire so as to present projecting warp ends. A fine narrow strip or ribbon of a suitable fusible metal (such as silver) is interposed between the cut ends of the opposed weft wires which are urged relative toward one another, while heat is applied to the fusible strip and the warp ends, as by a travelling gas flame. This produces an open flexible seam, which is mechanically strong and durable.—A.P.-C.

Press and Couch Device for the Filtered Residue From Screening Cylinders, Cell Drum Filters and Similar Machinery. Zellstofffabrik Waldhof, Mannheim. Ger. pat. 655,197 (Aug. 14, 1934).—The device consists of a number of narrow endless bands or ropes which move along side of each other and over the top of the filter cylinder. These narrow bands are made of a very elastic material and are held against the cylinder by means of corrugated rolls placed at various positions.—J.F.O.

Wire Fabric Seam and Method of Making Same. Wm. J. Taylor. U. S. pat. 2,137,789 (Nov. 22, 1938).—In order to join the ends of a wire fabric the warp wires of the ends to be joined are cut along the far face of a weft wire. The first terminal weft wire and the next weft wire are removed. A solder-covered wire is placed between the extended warp wire ends in substantially the position formerly occupied by the weft wire last removed. A hard "renitent" wire is placed parallel to the solder-covered wire and between the extended warp wire ends. The extended warp ends are cut at a place adjoining the far face of the "renitent" wire. The latter is removed and the fabric ends to be joined are placed adjacent each other in such a manner that the warp elements are in alignment and the projecting ends of the warp wires overlap more than one solder-covered wire. The fabric ends are then heated so that the solder is caused to flow over the surfaces abutting the solder-covered wire and the assembly is cooled to cause the solder to solidify.—A.P.-C.

Treatment of White Water. Adolf M. R. Karlstrom. Fr. pat. 832,753 (Jan. 28, 1938).—Organic sulphonated compounds, or their salts or derivatives, are added to the white water to flocculate the particles and facilitate their recovery or their retention on the paper machine wire if the white water is re-utilized directly.—A.P.-C.

Treatment of White Water in the Manufacture of Paper. A. M. R. Karlstrom. Brit. pat. 487,805 (March 15, 1937).—The solids in paper-machine white water are flocculated by the precipitating action of sulphonated vegetable, animal or mineral oils (or their salts or derivatives), or sulphonated petroleum acids or naphthenic acids, or their salts or derivatives, of high molecular weight (not less than C_{16}) in the white water. Turkey-red oil is an example, and the flocculating agent may be used in presence of non-sulphonated oils and alum, air or gas being introduced, if desired. The treatment is applicable to flotation save-alls.—A.P.-C.

Save-All. Hermann Wagner Company. Fr. pat 831,382 (Sept. 1, 1938).—For separating solid matter from paper or pulp mill white water there is used instead of a single separating tank, a number of tanks which are successively filled with the white water. It is allowed to rest in the tanks until the desired separation is effected. The liquids and the solids are discharged separately.—A.P.-C.

Process for Separating the Fibers From the White Water From Pulp and Ground Wood Mills, and for the Utilization of Same. Hackmann & Co. Johannes. Finn. pat. 17,869 (Sept. 23, 1935).—The white water is led through peat, coarse ground wood and a layer of sand if necessary and the fiberous material filtered off is collected and used.—J.F.O.

Process and Device for Filtering the Return Water Resulting in the Manufacture of Paper, Pulp and Ground Wood. AS Thunes Mek. Vaerksted, Skoyen, Norway. Finn. pat. 17,772 (Dec. 16, 1935).—The filter cloth is first provided with a layer of coarse fibers through which the return water is filtered.—J.F.O.

Process and Device for Removing the Layer of Paper Stock From the Conveyor Band of Cell Filters. Lamort Fils, Vitry, France. Ger. pat. 656,076 (March 3, 1934).—The conveyor band is kept under tension and vibrated at a speed of nearly 10,000 vibrations per minute. The vibrations are caused by a rapidly revolving roll.—J.F.O.

Apparatus for the Manufacture of Paper. Edward Hutchins, assignor to International Paper Company. U. S. pat. 2,141,393 (Dec. 27, 1938).—A number of rolls are mounted excentrically above and in close proximity to the fourdrinier wire, and an endless wire fabric passes around the rolls which, by their rotation, produce a kneading action of the layer of stock on the fourdrinier wire.—A.P.-C.

Covering for Dandy Rolls and Cylinder Molds. Nelson W. Webb, assignor to Eastwood-Nealley Corp. U. S. pat. 2,149,649 (March 7, 1939).—The covering is provided with a seam in which the ends of the wire cloth are brazed or soldered together, and brazed or soldered joints are provided between the seam structure and the cylindrical supporting surface of the roll or mold to prevent any tendency of the wire cloth to creep.—A.P.-C.

Screening of Suspensions of Fibrous Material. N. W. Johnsson and Aktiebolaget A. Ekströms Maskinaffär. Brit. pat. 493,138 (March 1, 1937).—A screen for paper pulp is kept drowned, is supported by resilient members to have freedom of motion in all directions in a vertical plane, and is vibrated to have orbital motion of amplitude not more than 8 mm. and frequency of 200 vibrations per min. Forms of screen surface, generally horizontal but having varying local inclinations, are claimed.—A.P.-C.

Pulp Screens. Nelson M. Knight, Brit. pat. 490,653 (Aug. 18, 1938).—The machines, having a vertical cylindrical screen with baffle plates extending therefrom and pulp-pulsating plates situated between the baffle plates, are provided with a resilient support for the screen that yields in the direction of movement of the pulsating plates as these are vibrated, whereby a more even relative movement between the pulsating plates and the baffle plates is provided.—A.P.-C.

Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 3, 1940

SUMMARY

Cigarette paper.....288 ctns., 10 bls., 1,253 cs.
Wall paper .....9 cs.
Paint paper.....8 cs.
Wall board .....1,573 bdls.
Newsprint ..... 350 rolls
Printing paper .....7 cs.
Wrapping paper .....148 bls., 351 rolls
Packing paper ..... 22 cs.
Kraft paper .....4 bls., 26 rolls
Filter paper .....14 cs.
Drawing paper .....3 cs.
Adhesive paper .....2 cs.
Surface coated paper .....185 cs.
Marble paper .....6 cs.
Transparent paper .....2 cs.
Parchment vellum .....1 cs.
Tissue paper .....141 bbls.
Transfer paper .....22 cs.
Letter paper .....9 cs.
Abrasive paper .....2 cs.
Greaseproof paper .....10 cs.
Miscellaneous paper .....69 bbls., 559 bls., 1,131 rolls, 2 cs.

CIGARETTE PAPER

P. Lorillard Co., Inc., *Mathilda Thorden,* Mantypulto, 244 cs.
———, *Estrella,* Seville, 10 bls.
Champagne Paper Corp., *Brand County,* Havre, 825 cs.
Braunstein Freres, Inc., *Brand County,* Havre, 8 cs., (book covers).
American Tobacco Co., *Brant County,* Bordeaux, 173 cs.
De Manduit Paper Corp., *Brant County,* Bordeaux, 3 cs.
———, *Brant County,* Bordeaux, 288 ctns.

WALL PAPER

S. K. Lonegren, ———, Gothenburg, 9 cs.

PAINT PAPER

Lansen Naeve Corp., *Brant County,* Havre, 8 cs.

WALL BOARD

Treetex Corp., ———, Gothenburg, 1,371 bdls.
Blanchard Lumber Co., ———, Gothenburg, 202 bdls.

NEWSPRINT

H. Reeve Angel & Co., Inc., *Mathilda Thorden,* Mantyluoto, 350 rolls.

PRINTING PAPER

Dingelstedt & Co., *Zaandam,* Rotterdam, 7 cs.

WRAPPING PAPER

Equitable Paper Bag Co., *Mathilda Thorden,* Mantyluoto, 351 rolls.
———, *Esterella,* Seville, 40 bls.
T. Barrett & Son, ———, Gothenburg, 74 bls.
T. Matchett, ———, Gothenburg, 34 bls.

PACKING PAPER

Keller Dorian Paper Co., *Brant County,* Havre, 22 cs.

KRAFT PAPER

———, ———, Gothenburg, 4 bls.
E. F. Eberlein, ———, Gothenburg, 26 rolls.

FILTER PAPER

D. C. Andrews & Co., *Brant County,* Havre, 4 cs.
E. H. Sargent & Co., ———, Gothenburg, 10 cs.

DRAWING PAPER

Lunham & Reeve, Inc., *Brant County,* Havre, 1 cs.
Steiner Paper Corp., *Aussa,* Trieste, 2 cs.

ADHESIVE PAPER

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SURFACE COATED PAPER

Gevaert Co. of America, *Bilderdyk,* Antwerp, 41 cs.
Gevaert Co. of America, *Olaf Bergh,* Antwerp, 144 cs.

MARBLE PAPER

Borden Riley Paper Co., *Olaf Bergh,* Antwerp, 6 cs.

TRANSPARENT PAPER

M. J. Corbett & Co., *Bilderdyk,* Rotterdam, 2 cs.

PARCHMENT VELLUM

American Bluefriesveems, Inc., *Bilderdyk,* Rotterdam, 1 cs.

TISSUE PAPER

Miller, Bryant, Pierce Co., *Mathilda Thorden,* Mantyluoto, 46 bbls.
Remington, Rand, Inc., *Mathilda Thorden,* Mantyluoto, 47 bbls.
H. M. Storms Co., *Mathilda Thorden,* Mantyluoto, 14 bbls.
Old Town Ribbon & Carbon Co., Inc., *Mathilda Thorden,* Mantyluoto, 34 bbls.

TRANSFER PAPER

Fraeger Shipping Co., *Aussa,* Trieste, 22 cs.

LETTER PAPER

———, ———, Marseilles, 6 cs.
W. J. Byrnes & Co., *Brant County,* Havre, 3 cs.

ABRASIVE PAPER

Freedman & Slater, *Brant County,* Havre, 2 cs.

GREASEPROOF PAPER

Bleyco Paper Corp., *Tanafjord,* Oslo, 10 cs.

MISCELLANEOUS PAPER

D. F. Young, Inc., *Mathilda Thorden,* Mantyluoto, 69 bbls.
American Trading Co., *Tanafjord,* Oslo, 286 rolls.
Lenny Karlgaard, *Tanafjord,* Oslo, 1 cs.
Prof. Holvik, *Tanafjord,* Oslo, 1 cs.
———, ———, Gothenburg, 751 rolls.
T. Matchett, ———, Gothenburg, 14 bls.
Kraemer & Co., ———, Gothenburg, 545 bls.
The Borregaard Co., Inc., ———, Gothenburg, 94 rolls.

RAGS, BAGGINGS, ETC.

W. I. Chudleigh, *Bilderdyk,* Antwerp, 20 bls. rags.
W. Steck & Co., *Cypria,* Buenos Aires, 35 bls. old rags.
Joe Levy & Son, *Olaf Bergh,* Antwerp, 86 bls. rags.
E. J. Keller Co., Inc., *Olaf Bergh,* ———, 146 bls. bagging.
Tradesmans National Bank, *Talisman,* ———, 100 bls. cotton waste.
Commercial National Bank, *Talisman,* ———, 100 bls. cotton waste.
National City Bank, *Aussa,* Trieste, 54 bls. bagging.

OLD ROPE

National City Bank, *Bilderdyk,* Rotterdam, 84 coils.
———, *Varagua,* Cristobal, 3 bls.

CASEIN

Chase National Bank, *Bilderdyke,* Antwerp, 57 bags.
American British Chemical Supplies, *Cypria,* Buenos Aires, 2,644 bags.
Balfour Guthrie & Co., *Nordfarer,* Buenos Aires, 2,617 bags, 157,020 kilos.
Chase National Bank, *Nordfarer,* Buenos Aires, 417 bags, 25,020 kilos.
American British Chemical Supplies, *Nordfarer,* Buenos Aires, 2,359 bags, 125,020 kilos.
———, *Brant County,* Bordeaux, 67 bags.

SKIN GLUE

American Union Transport Co., *Brant County,* Bordeaux, 150 bags.

WOOD PULP

Pulp Sales Corp., *Mathilda Thorden,* Rauma, 1,792 bls. prime strong sulphate pulp, 358 tons.
M. Sone, *Kolga,* Ornskoldsvik, 16,590 bls. wet mechanical pulp.
Pagel Horton & Co., Inc., *Lagaholm,* Gothenburg, 6,200 bls. wood pulp.
M. Sone, *Inger,* Stocka, 2,400 bls. wood pulp.
Pagel Horton & Co., Inc., *Erik Boye,* Sweden, 6,200 bls. wood pulp.
Price & Pierce, Ltd., *Erik Boye,* ———, 9,000 bls. unbleached sulphate pulp.
Pagel Horton & Co., Inc., *Trolleholm,* Sweden, 6,650 bls. wood pulp.
Price & Pierce, Ltd., *Trolleholm,* ———, 5,250 bls. unbleached sulphite pulp.

WOOD PULP BOARDS

Jay Madden Corp., *Mathilda Thorden,* Viipuri, 367 bls.
Bridgetts & Co., *Mathilda Thorden,* Viipuri, 196 bls.
Jay Madden Corp., *Mathilda Thorden,* Mantyluoto, 1,199 rolls, 1,240 bls.
H. Fuchs & Son, ———, Gothenburg, 3 crates.
Standard Fibre Specialty Co., ———, Gothenburg, 46 bls.
Fiber Case & Novelty Co., ———, Gothenburg, 75 bls.

NEW LONDON IMPORTS

WEEK ENDING FEBRUARY 3, 1940

Bankers Trust Co., ———, Sweden, 4,800 bls. dry sulphite pulp.
Price & Pierce, Ltd., *Novasli,* ———, 3,000 bls. unbleached sulphite pulp.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 3, 1940

Jay Madden Corp., *Mathilda Thorden,* Viipuri, 160 bls., 37 rolls wood pulp boards.
Public Ledger, Inc., *Mathilda Thorden,* Mantyluoto, 905 rolls newsprint.
H. Reeve Angel & Co., Inc., *Mathilda Thorden,* Mantyluoto, 251 rolls newsprint.
Jay Madden Corp., *Mathilda Thorden,* Mantyluoto, 1,895 rolls wood pulp boards.
M. Sone, *Danaholm,* Gothenburg, 5,000 bls. wood pulp.
Price & Pierce, Ltd., *Svaneholm,* ———, 180 bls. bleached sulphite pulp.
M. Sone, *Svancholm,* Gothenburg, 1,025 bls. wood pulp.

WILMINGTON IMPORTS

WEEK ENDING FEBRUARY 3, 1940

Price & Pierce, Ltd., *Ruth,* ———, 12,600 bls. unbleached sulphite pulp.

BALTIMORE IMPORTS

WEEK ENDING FEBRUARY 3, 1940

Jay Madden Corp., *Mathilda Thorden,* Mantyluoto, 738 rolls newsprint.
H. Reeve Angel & Co., Inc., *Mathilda Thorden,* Mantyluoto, 133 rolls newsprint.
M. Sone, *Kolja,* Hernosand, 6,000 bls. dry sulphite pulp, 6,000 bls. wood pulp.
Pagel Horton & Co., Inc., *Temnaren,* Sweden, 1,500 bls. wood pulp.
Price & Pierce, Ltd., *Svaneholm,* ———, 210 bls. bleached sulphite.
Pagel Horton & Co., Inc., *Danaholm,* Sweden, 3,625 bls. wood pulp.
Price & Pierce, Ltd., *Gunda,* ———, 4,080 bls. unbleached sulphite pulp, 12,000 bls. unbleached sulphate pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING FEBRUARY 3, 1940

De Manduit Paper Co., *Brant County,* Bordeaux, 777 cs. cigarette paper.

NORFOLK IMPORTS

WEEK ENDING FEBRUARY 3, 1940

R. J. Reynolds Tobacco Co., *Brant County,* Havre, 581 cs. cigarette paper.
Champagne Paper Co., *Brant County,* Havre, 422 cs. cigarette paper.
Loumar Textile By Products Co., *Brant County,* Havre, 274 bls. waste bagging.
American Tobacco Co., *Brant County,* Bordeaux, 56 cs. cigarette paper.
Champagne Paper Corp., *Brant County,* Bordeaux, 338 cs. cigarette paper.
R. J. Reynolds Tobacco Co., *Brant County,* Bordeaux, 2,511 cs. cigarette paper.

LOS ANGELES IMPORTS

WEEK ENDING FEBRUARY 3, 1940

———, *Tosei Maru,* Shanghai, 22 tons paper stock.
———, *Norway Maru,* Shanghai, 18 tons old bagging, 221 tons old rags.
———, *Annie Johnson,* Norrkoping, 1,120 rolls newsprint.

To Close Rogers Plant at Manchester

MANCHESTER, Conn., February 5, 1940—The Rogers Paper Company East mill, already temporarily closed due to a falling off of business, will be shut down for an indefinite period the first part of March, it was announced by officials of the company. Vice President Raymond A. St. Laurent of the firm said, in explanation, that within the past few years new machinery and equipment has been gradually installed in the Goodyear plant, and that with business conditions as they are, in the choice of mills to remain open to care for the present volume, the decision fell in favor of the Goodyear plant. It was emphasized that the move now is not a "removal" of the East plant or any of its equipment, but is an indefinite shutdown.

Men now employed in the East mill, in order of seniority will be given an opportunity to retain their work, transferring to the Goodyear division.

Battenville Mill Sold

The Gotham Tissue Corporation with general offices at 1000 E. 149th street, New York, has purchased the tissue mill at Battenville, N. Y. formerly operated as the Battenville Mills, Inc. The new owners will operate the property under the name of the Gotham Paper Mills, Inc. The new owners expect to begin operations on February 12.

Equitable Bag Moves Brooklyn Plant

Equitable Paper Bag Company has moved its Brooklyn plant to 47-00 31st Place, Long Island City, where it has leased nearly 125,000 square feet of space, 100,000 of which is on one floor, permitting straight-line layout of its equipment and manufacturing processes. The office covers 8000 square feet.

U. M. Pulp and Paper Alumni to Meet

The annual meeting of the University of Maine Alumni connected with or interested in the pulp and paper industry has been arranged as a luncheon to be held at the Hotel Roosevelt during Paper Week in New York on Wednesday, February 21.

New York Paper and Pulp Market Review

Wholesalers' Sales of Paper and Paper Products Continue Substantially Higher Than For Like Period Last Year—Higher Grades of Sulphite Pulp Scarce — Rag and Waste Paper Markets Quiet — All Prices Firm.

Office of the PAPER TRADE JOURNAL.
Wednesday, February 7, 1940.

The wholesale paper market continues to report sales volume at a relatively high level, despite the small decline this year from sales last December. According to a report by the Department of Commerce on February 5, industrial production has dropped a little from the high level of last year, but business continues good. Government economists expect a further decline next month but do not believe business will decline to the low levels of last Spring, when the Federal Reserve Board's index of production fell to 92 in May, 1939. Government experts expect the index to hold above 100 this year and state that the index dropped to 120 in January, compared to a record high of 128 in December, 1939. The index in the first quarter of 1939 averaged 100 and this year it is expected to average around 115.

The Department of Commerce reports sales of 2,276 wholesalers for December 1939 were 6.7 per cent higher than in 1938. Dollar sales of 92 reporting paper merchants were 12.2 per cent higher than for the like month in 1938, but 7.1 per cent under November, 1939. End of month inventories (cost) of 47 paper firms were up 8.4 per cent above December, 1938; accounts receivables of 79 firms were 12.4 per cent higher than in 1938, and 2.8 per cent under that of November, 1939. Sales in New England for December, 1939, were 18.1 per cent above the like month in 1938, in the Middle Atlantic States, 14.3 per cent higher; in the East North Central States, 12.7 per cent higher; in the South Atlantic States, 10.7 per cent higher; in the West South Central States, 3.1 per cent lower, and in the Pacific States, 6.1 per cent higher.

The index of general business activity declined to 103.2 per cent for the week ended January 27, from 103.7 per cent for the preceding week, compared with 92.1 per cent for the like week in 1939.

Paper production of 183 mills is estimated at 89.8 per cent for the week ended January 27, compared with 81.3 per cent for 1939, with 68.1 per cent for 1938, with 87.2 per cent for 1937, and with 74.9 per cent for the corresponding week in 1936.

Paper board production for the week ended January 27 was 75.0 per cent, compared with 68.0 per cent in 1939, with 60.0 per cent in 1938, with 81.0 per cent in 1937, and with 63.0 per cent for the corresponding week in 1936.

No important change has been reported in the newsprint market this week. The domestic consumption of newsprint last year is estimated at 3,550,000 tons or 54.1 pounds per capita, compared with 3,830,000 tons or 59.3 pounds per capita in 1937. The lowest level in the past 18 years was in 1933 when 2,690,000 tons of newsprint was consumed or 42.8 pounds per capita.

No important change in consumer demand is reflected in reports received from many manufacturers' representatives, jobbers, and general paper merchants during the current week. Volume has declined a little this month but sales are reported good in many grades of book, sulphite and tissue papers. Production and orders for kraft paper are reported to be well maintained and about equal to trade expectations. Prices on all grades of paper and paper board continue firm and, like most commodities the current price level is viewed as too low by many quarters in the trade.

Mechanical Pulp

No important change in demand or prices of mechanical pulp has been reported this week. Consumption continues at a good level and prices are firm, with the trend apparently upward.

Chemical Pulp

Nothing of importance has been reported in the chemical pulp market this week. Demand continues good. Prices are firm with the trend upward. The highest grades of pulp are reported rather scarce, notably that of prime unbleached sulphite. No price changes on any grade of pulp has been reported to date.

Rags

White cotton cuttings continue firm in a rather quiet market. No important change from prevailing representative market prices has been reported during the week. Export demand on white shirt cuttings is reported as fair.

Old Rope and Bagging

The old rope market continues firm under steady mill buying. No change in prices has been reported on any grade of rope, strings or threads.

The demand for old bagging is reported as a little improved this week, with higher prices expected in some quarters of the trade before long. Imports of old bagging for the first 11 months of 1939 totaled 25,759,088 pounds, valued at $562,896, compared with 51,506,463 pounds, valued at $1,335,365 for the like period in 1938.

Old Waste Paper

The paper stock market is reported as rather soft, under slow buying by board mills. Prices, while none too firm, continue unchanged.

Twine

No important change in demand or prices on any grade of hard or soft fiber twine has been reported during the current week. Prices continue firm with some quarters of the trade expecting a little higher prices in the near future.

Byron R. Cleveland Retires

The Smith and Winchester Manufacturing Company, South Windham, Conn. announce to its many patrons and friends among the paper mills, and the paper bag industry, the retirement on February 1 of Byron R. Cleveland, who has been associated with its interests since 1930, as its sales manager.

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, February 7, 1940.

BLANC FIXE—Quotations on blanc fixe are firm under a moderately good demand. The pulp is currently quoted at $35 per ton, in barrels, at works. The powder is quoted at $50 per ton, in bags, at works.

BLEACHING POWDER—Prices on bleaching powder are firm under a less active demand and unchanged at prevailing market levels. Bleaching powder is currently quoted at $2 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are a little lower for the week. Standard domestic casein, 20-30 mesh, is currently quoted at 14 cents per pound: 80-100 mesh, at 14½ cents per pound; all prices in bags, car lots. Argentina casein, 20-30 mesh, is quoted at 13 cents per pound. French casein is currently offered at 16 cents per pound.

CAUSTIC SODA—Prices on caustic soda are firm under a moderately active demand. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations in china clay are firm and continue unchanged at prevailing market levels. Domestic filler clay is currently quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $13.50 to $25 per ton, ship side.

CHLORINE—Prices on chlorine are firm under a moderately active demand. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for the current week. Prices on some grades are higher. "G" gum rosin is currently quoted at $5.35 per 280 pounds, gross weight, in barrels, Savannah. "FF" wood rosin is quoted at $5.20 per 280 pounds, gross weight, in barrels, New York. Seventy per cent gum rosin size is quoted at $2.87 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm under a good demand and are reported nominal. Domestic salt cake is currently quoted at $17 per ton, in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point. The quotation of $20 per ton on imported salt cake is nominal.

SODA ASH—Prices on soda ash are firm and continue to conform to prevailing market quotations. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Quotations on corn starch are firm and continue unchanged for the current week. Globe pearl is currently quoted at $2.50 per 100 pounds; special paper starch at $2.60 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices on sulphate of alumina are firm and continue unchanged at prevailing market quotations. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at $1.45 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Quotations on sulphur are firm and are reported to conform to prevailing market prices. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Prices on talc are firm and continue unchanged at prevailing market quotations. Domestic talc is currently quoted at from $15 to $18 per ton, Eastern mines. Imported talc is offered at from $23 to $45 per ton.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$5.00	@	$5.50
Superstandard	4.62½	"	5.00
Northern Standard Wrapping	4.25	"	4.62½
Standard Wrapping	4.00	"	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	"	—
White No. 1½	.70	"	—
White No. 2	.65	"	—
Anti-Tarnish M. G.	.80	"	—
Colored	.87½	"	—
Kraft	.80	"	—
Manila	.65	"	—
Unbl. Toilet, 1 M.	3.50	"	—
Bleached Toilet	5.26	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	1.95	@	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	10.25
No. 1 Manila Wrapping, 35 lb.	5.25	"	—
No. 2 Manila Wrapping, 35 lb.	5.00	"	—
Boards, per ton—			
News	45.00	@	—
Chip	45.00	"	—
Sgl. Mla. Ll. Chip	57.50	"	—
Jute Lined Chip	57.50	"	—
White Pat. Coated	70.00	"	—
Kraft Liners	55.00	"	—
Binders Boards	76.00	"	87.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	" 36.50	32.20	" 37.75
85% Rag	....	"	29.90	" 35.00
75% Rag	23.60	" 27.75	24.75	" 29.00
65% Rag	....	"	21.65	" 26.25
50% Rag	17.55	" 21.50	18.70	" 22.75
25% Rag	14.65	" 17.75	15.80	" 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.95	@ $11.00	$10.10	@ $12.25
No. 2	8.05	" 9.75	9.25	" 11.25
No. 3	7.60	" 9.25	8.50	" 10.75
No. 4	7.30	" 9.00	8.50	" 10.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$11.90	@	$13.50
No. 2 Glossy Coated	10.35	"	11.75
No. 3 Glossy Coated	9.55	"	11.00
No. 4 Glossy Coated	9.15	"	10.50
No. 1 Antique (watermarked)	8.35	"	9.50
No. 2 Offset	7.70	"	9.00
A Grade E. F.	7.50	"	8.75
A Grade S. & S. C.	7.75	"	9.00
B Grade E. F.	6.95	"	8.00
B Grade S. & S. C.	7.20	"	8.25
C Grade E. F.	6.65	"	7.75
C Grade S. & S. C.	6.90	"	8.00
D Grade E. F.	6.40	"	7.50
D Grade S. & S. C.	6.65	"	7.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	$38.00	@	44.00
Dry	38.00	"	44.00
(Delivered)			
No. 1 Domestic and Canadian	40.00	@	42.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	3.00	@	3.40
Prime Qualities—			
Easy-Bleaching Sulphite	2.75	"	2.95
Strong Unbleached Sulphite	2.75	"	2.85
(On Dock, Atlantic Ports)			
Kraft Bleached	3.00	@	3.50
Kraft Light & Strong	2.50	"	2.75
Kraft No. 1	2.40	"	2.65
(F. o. b. Pulp Mill)			
Kraft Domestic	1.80	"	2.12½
(Delivered)			
Soda Bleached	2.90	"	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	7.50	@	7.75
Silesias No. 1	4.50	"	4.75
New Unbleached	7.50	"	7.75
Blue Overall	5.00	"	5.25
Fancy	2.25	"	2.50
Washables	2.00	"	2.15
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.25	"	3.50

Old Rags

White, No. 1—			
Repacked	3.25	"	3.50
Miscellaneous	2.75	"	3.00
White, No. 2—			
Repacked	2.50	"	2.75
Miscellaneous	2.00	"	2.25
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.75	"	1.90
Roofing Rags—			
No. 1	1.50	"	1.55
No. 2	1.20	"	1.27½
No. 3 (bagging)	1.50	"	1.60
No. 4	.60	"	.65
No. 5A	.60	"	.65

Foreign Rags

All prices nominal.

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxford	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—

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All kinds and styles of Felts for all kinds and styles of Papers.

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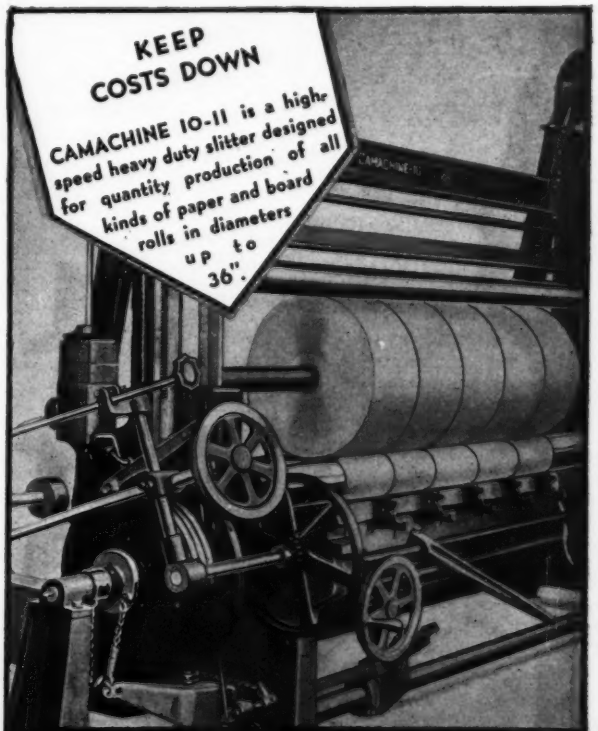
CAMACHINE 10-11 is a high-speed heavy duty slitter designed for quantity production of all kinds of paper and board rolls in diameters up to 36".



CAMERON MACHINE COMPANY
61 Poplar St. BROOKLYN, N.Y.

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	"	4.75
No. 2 White Cotton.	3.25	"	3.75
No. 3 White Cotton.	2.50	"	3.00
No. 4 White Cotton.	1.90	"	2.20
Extra Light Prints..	2.00	"	2.40
Ord. Light Prints...	1.75	"	2.15
Med. Light Prints...	1.55	"	1.95
Dutch Blue Cottons.	2.25	"	2.50
French Blue Linens..	3.00	"	—
Checks and Blues...	2.00	"	—
Linsey Garments....	1.90	"	2.00
Dark Cottons.....	1.50	"	1.60
Old Shopperies.....	1.30	"	1.45
New Shopperies.....	1.45	"	1.50
French Blues.....	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.50	@	2.75
Domestic	2.25	"	2.50
Wool Tares, light...	1.75	"	2.00
Wool Tares, heavy..	1.80	"	1.90
Bright Bagging.....	2.25	"	2.50
Manila Rope—			
Foreign	4.25	"	4.50
Domestic	4.25	"	4.50
Jute Threads.....	3.00	"	3.25
Sisal Strings.....	2.00	"	2.25
Mixed Strings.....	.70	"	.85

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1....	2.25	@	2.50
Soft White No. 1..	1.80	"	1.90
Soft White Extra..	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag....	1.00	"	1.10
Solid Flat Book...	.80	"	.90
Crumbled No. 1...	.70	"	.75
Ledger White Stock.	1.75	"	1.85
Ledger Stock Colored	1.05	"	1.15
Manila—			
New Env. Cut....	1.70	"	1.80
New Cuttings.....	1.40	"	1.50
Old Kraft Machine—			
Compressed bales..	1.35	"	1.40
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue.	.70	"	.75
Strictly Folded....	.47½	"	.52½
Corrugated	.60	"	.65
No. 1 Mixed Paper..	.27½	"	.32½

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.18½	@	—
White Hemp.....	.18½	"	—
Fine Polished—			
Fine India.....	.23	"	—
Unpolished—			
Box	.14¾	"	—
Paper Makers.....	.15	"	—
Tube Rope.....	.16¼	"	—
Wall Paper.....	.15¾	"	—
Wrapping	.18	"	—
Soft Fiber Rope...	.16¼	"	—
Cotton	.21	"	—

(Hard Fiber)

Medium Java.....	.19	"	—
Mex. Sisal.....	.16	"	—
Manila	.24	"	—

Domestic	4.00	@	4.50
Sisal Rope	2.25	"	2.50
Mixed Rope	.75	"	1.00
Transmission Rope..	3.00	"	3.50
Soft Jute Ropes.....	3.00	"	3.50
Jute Carpet Threads.	1.25	"	1.50
Gunny Bagging—			
Foreign	3.00	@	—
Domestic	2.45	"	2.50
Bleachery Burlap....	3.50	"	3.75
Scrap Burlap—			
Foreign	2.40	"	2.50
Domestic	2.00	"	2.25
Scrap Sisal.....	2.25	"	2.50
Scrap Sisal for Shredding	2.50	"	2.75
Wool Tares, Heavy..	2.50	"	2.60
New Burlap Cuttings	3.25	"	3.50
Aust. Wool Pouches.	3.25	"	3.50
Heavy baling bagging	2.65	"	2.75
Paper Mill Bagging..	1.25	"	1.50
No. 2 Bagging	1.10	"	1.25

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1...	.08	"	.08¼
New Light Flannelettes	.05	"	—
Silesias No. 1	.05	"	—
New Black Silesias..	.03½	"	.03¾
Soft Unbleached....	7.50	"	8.00
Blue Cheviots	.05½	"	.06
Fancy	.02	"	.02½
Washable	.02	"	.02½
Cottons—According to grades—			
Blue Overalls	.05¼	"	.05½
New Black, soft ..	.03¼	@	.04
Khaki Cuttings	.02½	"	.03
O. D. Khaki	.03	"	.03¼
Corduroy	.02¼	"	.03
New Canvas.....	.06¾	"	.07¼
B. V. D. Cuttings...	.07	"	.07½

Domestic Rags (Old)

(F. o.b. Boston)

Canvas	.04¼	@	—
White No. 1—			
Repacked	—	"	2.75
Miscellaneous	2.50	"	2.75
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.25
Twos and Blues	2.25	"	2.50
Old Blue Overalls ..	1.60	"	2.00
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.50	"	1.60
Black Stockings	4.00	"	4.25
Roofing Stock—			
No. 1.....	1.75	"	2.00
No. 2.....	1.60	"	1.65
No. 3.....	1.00	"	1.25

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....(nominal)	
Dutch Blues.....(nominal)	
New Checks and Blues(nominal)	
Old Fustians.....(nominal)	
Old Linsey Garments.(nominal)	
New Silesias.....(nominal)	

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f.o.b. Phila.)

Shirt Cuttings—			
New White No. 1.	.07¼	@	.07½
New White No. 2.	.04	"	.04½
Light Silesias.....	—	"	.04½
Silesias, No. 1....	—	"	.04½
Black Silesias, soft	—	"	.03¾
New Unbleached..	.05½	"	.06
Washable, No. 1..	—	"	.04
Blue Overall.....	—	"	.05
Cottons—According to grades—			
Washable No. 2...	—	"	.02
New Blue	—	"	.02
Fancy Percales....	—	"	.03
New Black Soft...	—	"	.04
New Light Seconds	.04½	"	.05
New Dark Seconds	—	"	1.55
Khaki Cuttings—			
No. 1 O. D.....	.03½	"	.04
No. 2 Mixed.....	.03	"	.03¼
Corduroy	—	"	.02½
New Canvas.....	.05½	"	.06
New Black Mixed.	—	"	.03

Domestic Rags (Old)

White No. 1—			
Repacked	3.25	@	3.75
Miscellaneous	2.75	"	3.00
Thirds and Blues—			
Miscellaneous	2.00	"	2.25
Repacked	2.50	"	2.75
Black Stockings (Export)	3.50	"	4.00
Roofing Stock—			
Foreign No. 1....Nominal			
Domestic No. 1..	1.50	"	1.60
Domestic No. 2...	1.35	"	1.45
Roofing Bagging..	—	"	1.30

Bagging

(f.o.b. Phila.)

Gunny, No. 1—			
Foreign .....Nominal			
Domestic	2.50	@	3.00
Manila Rope.....	3.25	"	3.75
Sisal Rope.....	1.75	"	2.00
Mixed Rope.....	1.25	"	1.50
Scrap—			
No. 1.....	2.00	"	2.50
No. 2.....	—	"	1.30
Wool Tares, heavy..	3.50	"	3.70
Mixed Strings	.75	"	1.00
No. 1 New Light Burlap	3.00	"	3.50
New Burlap Cuttings	2.00	"	2.25

Old Papers

(f.o.b. Phila.)

Shavings—			
No. 1 Hard Write	2.25	@	2.30
No 2 Hard White	2.00	"	2.10
No. 1 Soft White	1.85	"	1.90
No. 2 Soft White	1.50	"	1.60
No. 1 Mixed.....	.90	"	1.00
Solid Ledger Stock..	1.50	"	1.60
Ledger Stock, white.	1.40	"	1.45
Ledger Stock, colored	1.10	"	1.20
No. 1 Books, heavy..	.90	"	.95
Manila Cuttings.....	1.75	"	1.80
Print Manila.....	.60	"	.70
Container Manila....	.50	"	.60
Kraft Paper.....	1.00	"	1.10
No. 1 Mixed Paper..	.40	"	.45
Straw Board Chip...	—	"	.40
Binders Board Chip..	.40	"	—
Corrugated Board...	.60	"	.65
Overissue News.....	.70	"	.75
Old Newspapers.....	.50	"	.55

BOSTON

Old Papers

(f.o.b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White	1.85	"	2.15
No. 2 Mixed.....	.75	"	.80
Solid Ledger Books..	1.30	"	—
Overissue Ledger Stock	1.30	"	1.50
Mixed Ledgers.....	.85	"	.90
No. 1 Books, heavy..	1.00	"	1.10
No. 1 Books, light..	.65	"	.75
Crumpled Stitchless Book Stock.....	.55	"	.65
Manila Env. Cuttings	1.70	"	1.85
Manila Envelope Cuttings, extra quality	2.35	"	2.60
White Blank News..	1.40	@	1.50
No. 1 Kraft.....	1.10	"	1.20
Mixed Papers.....	.35	"	.40
Print Manila.....	.65	"	.70
Container Manila...	.60	"	.70
Old Newspapers....	.60	"	.65
Paper Wool Strings	.80	"	.90
Overissue News.....	.70	"	.75
Box Board Chips....	.50	"	.52½
Corrugated Boxes....	.50	"	.60
Kraft corrugated boxes	1.05	"	1.10
Screening Wrappers	.60	"	.70

Bagging

(f.o.b.Boston)

Manila Rope—			
Foreign	4.50	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots.			
No. 1 White $36.50		@	—
No. 1 Tints	37.50	"	—
No. 2 White	26.50	"	—
No. 2 Tints	27.50	"	—
No. 2 Golden Rod..	28.50	"	—
No. 3 White	22.00	"	—
No. 4 White	15.50	"	—
No. 4 Tints	16.50	"	—
No. 4 Golden Rod..	17.50	"	—
Direct mill shipment in three-ton lots.			
No. 5 White $10.40		@	—
No. 5 Tints	11.40	"	—
No. 5 Golden Rod..	12.40	"	—
No. 6 White	9.40	"	—
No. 6 Tints	9.90	"	—
No. 6 Golden Rod..	11.40	"	—
No. 7 White	8.40	"	—
No. 7 Tints	8.90	"	—
No. 7 Golden Rod..	10.40	"	—
Book—			
No. 1 M. F.	$7.75	"	—
No. 2 M. F.	7.25	"	—
No. 3 M. F.	6.60	"	—
No. 1 S. C.	8.25	"	—
No. 2 S. C.	7.75	"	—
No. 3 S. C.	6.25	"	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$12.15		@	—
No. 2	10.50	"	—
No. 3	9.45	"	—
Coated tinted.....	13.20	"	—
Golden Rod.....	14.80	"	—
Wrapping—delivered—			
Rag Brown.....	4.85	"	5.25
White Wrap.....	4.00	"	—
"B" Manila.....	4.90	"	6.15
No. 1 Manila....	$5.50	@	$6.90
Fiber	5.50	"	6.90
Kraft No. 2.....	5.50	"	6.90

(f.o.b. Cars, Toronto)

News per ton—			
Rolls (contract)..	46.00	"	—
Sheets	54.00	"	—

Pulp

Ground wood.....$36.50		@	—
Unbleached sulphite.	54.00	"	—
Bleached sulphite...	64.00	"	—
Kraft	47.50	"	—
Soda	58.00	"	—

Old Waste Paper

(In carload lots, f.o.b. Toronto)

Shavings—			
White Env. Cut..	2.15	@	—
Soft White.....	2.00	"	2.15
White Blk. News..	1.35	"	1.50
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	"	1.00
Light and Crumpled Book Stock.....	.80	"	.90
Ledgers and Writings	1.15	"	—
Manilas—			
New Manila Cut..	1.55	"	1.60
Printed Manilas...	.70	"	—
Kraft	1.15	"	—
News and Scrap—			
Strictly Overissue	.75	"	—
Strictly Folded ..	.70	"	—
No. 1 Mixed Paper	.60	"	—

CHICAGO

Waste Paper

(f.o.b. Chicago)

Shavings—			
No. 1 White Envelope cuttings..	2.40	@	—
No. 1 Hard White	2.23	"	—
No. 1 Soft White	2.00	"	—
Ledger and Writings	1.20	"	—
Solid Books.....	.95	"	—
Blanks	1.70	"	—
Krafts	1.00	"	—
New Kraft Cuts.....	1.60	"	—
Overissue News.....	.80	"	—
Old Newspapers—			
No. 1 Folded News	.73	"	—
No. 1 Mixed Paper	.63	"	—
Roofing Stocks—			
No. 1	1.25	@	—
No. 2	1.15	"	—